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ABSTRACT

The purpose of this paper is to disconfirm Piaget's theory of an invariant sequence of intellectual maturation for all youths in all cultures. The author's view is that the kinds and sequences of human development vary greatly, depending on the cultural milieu. The author derives 36 propositions from Piaget's theory, dismisses 5 of them as definitional and therefore not subject to testing, then uses evidence taken from 173 reports on 49 cultures to disconfirm the remaining 31 propositions in whole or in part. For example, Piaget claims that preconceptual categorizing arises between the ages of 21 and 48 months. The author cites counter examples, such as the Hottentot child that is taught by its mother to identify and gather edible roots, wild honey, lizards, and mice as soon as it can stand. Another proposition, stating that intellect peaks in logic and mathematics, is criticized as European-centered and in conflict with the higher regard in which tradition and experience are held in many cultures. The author's own theory of cultural materialism, which stresses the importance of various cultural influences rather than a genetically-determined sequence of intellectual development, is not elaborated here. The author notes that Piaget recognizes the existence of culture, but characterizes Piaget as using the concept of culture as a mere dumping ground for contrary evidence. (IM)

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PIAGET VERSUS MATERIALISM:

A CONCORDANCE OF THE DISCORDANCE

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SUMMARY

In 36 gradually enunciated propositions, Jean Piaget delineated cognitive maturation via a "decalage" of essentially globally-uniform skills triggered biologically by slightly variable birthdays. In contrast, Darwinism found that adaptiveness concerns the micro-ecology. When this principle is extended to culture, it suggests that enculturation must diversify to befit particular times and economies. Society does not await a child's understanding; it immediately imposes actuarially developed customs. Materialism considered culturally suggests that youth learns less from the "dawning of genes" than from work preparation, the "donning of jeans."

Vast amounts of counter-evidence have accumulated from ethnography and experimentation. We select examples from 49 cultures and 173 reports, arraying them by the Piagetian propositions that they each disconfirm.

POSSIBLE INDEXING WORDS (in decreasing importance):

Piaget, Jean. Cognition. Maturation. Materialism. Decalage.

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PIAGET VERSUS MATERIALISM:

A CONCORDANCE OF THE DISCORDANCE

THE BATTLE JOINED: A SUMMARY OF PIAGETISM

"Jean Piaget's theory of the development and structure of the intelligence unquestionably represents the greatest intellectual achievement of any living behavioral scientist." Thus began one leading review article of a leading social-science journal (Turner 1973:351), which gradually turned skeptical.

The present author develops that skepticism to argue that Piaget commingles two disparate talents, which must be separated if maturational science is to evolve. We gladly acknowledge the Swiss's stately fame for providing ethnography of European children between World Wars I and II. That breakthrough has significantly attracted other behavioral scientists to an emergent discipline of intellectual maturation (Burger ms.).

But his ethnographic particulars have erroneously crystallized into an ethnological doctrine about all children. This alleged universality of of maturational sequence is, we fear, considered his major accomplishment. And so the present article will contend, in contrast, that his theses are but a hodgepodge totally inappropriate for an emergent, harmonious paradigm of behavioral science; indeed, that his specific pan-cultural propositions are individually either trite or disproved.

We must challenge Piagetism on three broad fronts. First, it is argued that many of his "discoveries" rest in fact on mere definition rather than on his clinical reports. Secondly, his testable claims, such as of world-wide maturational sequences, may be disconfirmed by contrary evidence, usually from Third World cultures. And lastly, his analysis of mere individuals rather than of groups and economies

is only one of several possible theory-sets ("disciplinary matrixes") whereby maturation may be interpreted.

Piaget's scheme is vast. Mere aspects of it have required lengthy detail, as in Ashton (1975); Ginsburg and Opper (1969); Hallpike (1976); Modgil (1974); and Palfrey (1972). Hence the present author's three approaches require lengthy demonstration. But every issue of each journal seeks readership specialization. This fact behooves separation of our triad. The first approach ("merely definitions") is discussed elsewhere (Burger 1977a) in what we shall cite as our "definitional argument."[1] Still elsewhere (Burger ms.) is our third analysis, arguing that Piaget's pan-cultural yet individualistic viewpoint misfits the behavioral-science trend to pinpoint ethnic phases. Indeed, that combination of any particular ethnic system and a particular time period (such as Victorian England) can be referred to as one zeitgeist or, in the terminology discussed below, one techno-environment. We shall cite that third paper as our "context-trend argument."

But the second of the three problems is the central one for the present article. It is the fundamental theoretical question of allegedly global maturational sequences. We argue here that the Piagetian paradigm suggests internally preprogrammed phasing which the environment merely triggers-on, but that in fact the kinds and sequences of human ontogeny vary as they encounter each phase of each milieu.

The Swiss scheme is more than a scientific hypothesis; it is a world-view. Its magnitude justifies some license to its codifiers/critics. We must cite some early biogenetic writings which Piaget himself now overslips -- to show the a-theoretical patchwork of his system, not to imply that anyone must remain immutable. We must also go beyond citation of only original sources, since far clearer summaries have often come from his interpreters, whether or not they supported him, even after we allow for problems of translating from French.

Much of his structuralism could be grouped within the following three themes: Biology provides a structure that engenders conceptual (not merely animalistic) maturation. The sequence of a

child's acquisition of his skills and concepts is inevitable. And the phases appear as specific chronological ages, slightly variable for reasons that the scheme cannot specify. One may oversimplify such a plan by comparing Piaget's child to a multi-stage rocket: As soon as that missile attains each of the predetermined altitudes, a new engine is actuated; but it has been completely pretuned. Or, to analogize to modern pharmacology, Piaget's maturational concept may be said to resemble the microcapsules which contain timed-release doses; to simplify via the trademark of Smith, Kline & French Laboratories, the "Spansule." Thus we do not say that Piaget is a genetic determinist, He is an interactionist, but his range of environments has merely on-off binary switches, not gradated dials or truly branching algorithms.

Nowhere, however, does the Swiss present his program so simply, even after we allow for problems of translating from French. Many publications have, it is true, refuted one or another part of the decalage. Yet so diffuse have been their arguments that the impression remains (as seen in the earlier-quoted Turner glorification) that the scheme is essentially sound, needing at most some cosmecics. We argue the contrary: that his descriptive details are superb, but his theoretical core is an untenable mishmash: Each disproof of it has been answered by his adding an additional set of factors, so that Piagetism is mere eclecticism masquerading as theory.

Hence didactics requires a journal-article anthology of his propositions, and of test outcomes of each. It will be necessary to specify each smaller, more clearly alleged Piagetian branch, even at the cost of some overlap, and even though the vast scope will necessitate almost telegraphic excerpting. Those claims which our "definitional argument" demonstrates to be simply successive terminology will, however, merely be crossreferenced from, and not reiterated in, the present article. For example, Piaget implied that comparison skill facilitates measurement skill, in turn facilitating interchangeability skill that is

a component of permanence-perception -- of commutativity. But the dictionary definition of measuring is to compare and to regulate. Hence no amount of ethnography could disprove that truism -- nor is any amount of clinicalism necessary to prove it. Such analysis is therefore shunted into the definitional article.

Here, by contrast, we consider the decalage parts that we do not believe are axiomatic. They are all of the claims that do not absolutely follow from the successive definitions. For example, that skill a + b must follow skill a is axiomatic -- but not that a + b must emerge at age 7-1/2.

Our data must be evidenced sporadically rather than statistically for several reasons. First, the aforementioned vastness of Piagetian literature prevents its entire scrutiny. Secondly, the newness of educational anthropology justifies its citing of single, detailed existing ethnographies, rather than requiring years' wait for the appearance of controlled, multi-source methods (=hologeistics).

Hence we must begin by numerating Piaget's global scheme. This process will fill the remainder of the present article's section I. The balance of this article applies an alternative paradigm, that called "cultural materialism." It simultaneously serves as a concordance to contrast each psychobiological proposition with ethnographic counter-evidence.

Cultural materialism will be sketched just before that counterevidence begins. But the Sapir-Whorf Hypothesis reminds us (Hoijer 1954) that linguistic style correlates with world-view. Therefore we note here that cultural materialism potentially changes behavioral science from intransitive, structural statements to causative ones. And so the present article will be stated largely via transitive verbs, implying that culture can be consciously engineered to some degree. Such grammar will sound jargonistic to the descriptivists, who have unconsciously imagined the "just-so" world to be static; but so be it.

We cannot claim to state every rule that has emanated from Piaget. Even standard textbooks disagree over those concepts. And so the present author has continually refined his list over

half a dozen years, and perceived that some required far more explanation than others. For classroom instruction, he gradually apportioned them for equal ease of presentation (not necessarily of validity), and will here present them in that sequence. The very fact that it requires fully 36 propositions to state Piagetism is in itself an indication that the scheme is a patchwork rather than a true paradigm. (Einstein's much farther-reaching paradigm involved only three factors!)

We must cite the Piagetian scheme so often that stylistic elegance behoove our titling it under divers names. Some will be locational, such as Swiss, Helvetian, or Genevan. Others will be conceptual, such as Doctrine of Invariant Sequence (as it was skeptically termed by Shweder and LeVine 1975), or (for reasons that the present author details in the "context-trend" argument) "multi-stage rocketry," "timed-release system," "Spansule," "biogeneticism," "psychobiology," "genetic-epistemology," "decalage," or, since it underpins his overall plan, simply "Piagetism." These hypostases are intended purely descriptively/stylistically, and not pejoratively.

For later citation and questioning, then, let us now enumerate the Piagetian propositions.

1. Certain intellectual skills arise as young humans mature.

2. The skills arise in a sequence, not simultaneously. "We will distinguish . . . four principal periods, following that characterized by the formation of sensori-motor intelligence," declared Piaget (1947:1950 :123). The Piagetians (Boyle 1969:31) termed this principal maturational sequence as a vertical decalage.

3. This skill-sequence or vertical decalage is a discovery, in the sense that we could not have predicted its gradual accumulation.

4. Growth unbalances an individual, but the balance is redressed as the cognitive system adopts logic and mathematics. "The living organization is essentially an autoregulation. . . ." (Piaget 1967: 1977:848). "A state of equilibrium . . . is one in which all the virtual transformations . . . compensate each other. From a psychological point of view, the logical structures correspond precisely to this model"

(Piaget 1952:1977:473).

". . . The cognitive organization is an extension of the vital organization and so introduces some equilibration into those sectors where the organic equilibrium remains insufficient. . . .

". . . .The equilibrium between accommodation and assimilation . . . is brought about by logico-mathematical structures . . . [which] do, in fact, attain permanent equilibrium despite the constantly renewed constructions which characterize their own evolution" (Piaget 1967:1977: 848-50).

5. "In the field of experimental knowledge, . . . a new theory . . . simply adds on to this integration such retroactive corrections as may be necessary. . . ." (Piaget 1967:1977:850). "No new structuration brings about the elimination of those preceding it. . . ." (Piaget 1967:1977:848).

6. Intellect peaks in mental abstraction. "Intellectual operations, whose highest form is found in logic and mathematics, constitute genuine actions. . . ." (Piaget 1947:1950:16).

And a second half follows, that these are the important skills for survival: "Adaptation must be described as an equilibrium between the action of the organism on the environment and vice versa" (Piaget 1947:1950:7). ". . . Equilibrium is defined by reversibility . . . [in] the activity of intelligence, which is [increasingly] capable of detours and returns" (Piaget 1955b:1977:817). And "intelligence, whose logical operations constitute a mobile and at the same time permanent equilibrium between the universe and thought is . . . a perfection of all adaptive processes" (Piaget 1947:1950:9). "Intellectual operations,

7. Each intellectual skill cannot emerge before a certain age; biology essentially sets that lower structural limit. "The groupings of concrete operations . . . at the age of 7 to 11, are the culmination of a process. . . ." (Piaget 1966c:1977:399). But "at the level of the grouping of concrete operations, . . . the child does not yet have at his disposal . . . to compose thereby the inverse and reciprocal transformations. . . ." (op. cit.:400). And similar age/skill bracketings appear throughout Piaget.

8. The actual (rarely lower, often higher) age of appearance

adjusts to environmental factors: "Needless to say, these average ages are dependent on the social and educational environment" (Piaget 1964: 1967:124). And the Genevan remarked elsewhere (1956:1960:1971:IV-13-14), "Naturally it is possible for both achievement and preparation to be promoted or hampered by favorable or unfavorable external situations (hence the possibility of crises as natural transitions between one stage and the next)."

Similarly, his collaborator Inhelder (1953:1956a:I-85) summarized Piaget's systematic findings in his presence, concluding that ". . . the age at which the [intellectual] structures appear is relative to the environment, which can either provoke or impede their appearance. . . . The age of realization cannot be fixed absolutely; it is always relative to the environment."

And Piaget likewise conceded recently (1968b:145) that "biological maturation clearly needs to be supplemented when we see that the speed of development of operational structures is dependent upon cultural settings, individual experience, etc."

9. A sensorimotoric mentality appears from birth to the approximate age of 1-3/4. Its components are vaguely mentioned to range from "systematic thumb-sucking by coordination of the movements of the arm . . ." (Piaget 1947:1950:100) to optical illusion (ibid.:83). The

But "the roots of these structures are independent of language" (Inhelder and Piaget 1959:1977:372). The

present author's "definitional argument" shows that such talents are the combination of motorism and simple intellection, constituting observation.

10. From 1-3/4 to about four, there appears a preconceptual mentality. Our "definitional argument" shows that this Piagetian stage combines the previous phase's observation with culture-specific classification to begin to create categorization. Piaget distinguished five kinds, "whose appearance is almost simultaneous": "deferred imitation," "symbolic play," "the drawing or graphic image," "the mental image," and "verbal evocation of events that are not occurring at the time" (1966: 1977:490).

11. From four to around 7-1/2, there arises a preoperational

mentality: "egocentrism, in which things are considered to depend solely on his personal activity" (Piaget 1937:1977:283), as when the child "considers his own perspective as absolute and attributes it to the doll" (op. cit.:282).

Our "definitional argument" reveals it consisting in phenomenally studying the previous phase's category; in a word, subjectifying it.

12. The preoperational child believes in heteronomy -- that power is external. He therefore denies violence and chance. Thus, citing both his own Genevan experiments and the philosopher Aristotle, Piaget argued (1930:1965:275) that the school beginner expects everything to be harmonious and planned. He imagines that games and other rules are sacredly inflexible (Stephens 1965:250) rather than rationalizable.

13. Since a rule is inflexible, it should be applied consistently. Thus, "applications of Piaget's learning theory" by Brearley and others (1969:1970:141) tell us that "the growth of self-awareness is helped too by consistent treatment from adults and hindered by inconsistency."

14. Since rule application is or should be consistent, the preoperational child evaluates defiance or immorality by the amount of its resultant material damages (Bandura and Walters 1963:206-07).

15. From age 7-1/2 to 11-1/2, the child begins to circumstantiate ("to decenter") his sensations to the environment.

Logic now begins to develop (although not becoming fully flexible until the next stage, beginning at 11-1/2), as the improving neurology mentally fixes each datum. Piaget's 1921 pronouncement on this matter was discussed by Trabasso and others (in press, "Introduction"): Piaget assumed that the resultant sequential-arrangement ability, sometimes termed "transitive inference," reveals reasoning skill. It produces a "concrete-operations" mentality: ""We can, with the aid of concrete operations, classify, order serially, form equalities or set up correspondences between objects, etc., without these operations being combined into a single structured whole" (Piaget 1952:1977:461). The present author's "definitional argument" summarizes that such skills consist in maneuverably decentering the prior era's subjectivity.

They constitute, in a word, objectification.

16. Since power is believed external, young children imagine a spirit indwelling in every material; they are animistic, especially in primitivity (Piaget, discussed in Dennis 1951:162). "The preconceptual structure . . . explains animism, artificialism, and magico -phenomenist participations. . . ." (Piaget 1945:1962:270; cf. 253-57). But "decentering" replaces the subjectivity, so that age ever less attributes spirit to materials (cf. Goodman 1970:123).

17. "Decentering" gradually replaces the subjectivity, so that age ever less attributes spirit to materials (Piagetism discussed in Goodman 1970:123). "During the second stage, the explanations are artificialist, animistic, and dynamic. . . . About the age of 7-8 (third period) . . . the preceding forms of explanation disappear progressively" (Piaget 1927:1977:143).

18. In objectification, a child must mentally enumerate sets of objects to determine whether they are equivalent (as when he sees two homotaxic rows but is forbidden to manipulate them). In this case, argued the Piagetian, Flavell (1963:360-61), there seems to be "a stage on the developmental route to genuine conservation of number in which [e. g.] 'seven' is simply the name of any collection in which one must count to seven in order to enumerate all its elements." Piaget and P. Gréco termed such a number-name as quotité (ibid.).

Numeration is, furthermore, a waystation toward other maturations: "The conversion of intensive logical elements into iterable units with numerical quantification yields arithmetic operations. Similarly," continued Flavell (1963:199), "when infra-logical elements (e.g., the parts of a whole) become iterable units, one gets measurement operations (e.g., Piaget and Inhelder, [1948a:] 1956, p. 482)." Measurement is, in turn, an aspect of the comparison which will underlie the concept of conservation or indestructibility.

19. The talent of objective equivalence enables analogy. "Looked at from the standpoint of Piagetian psychology," declared Elkind (1969c:327), ". . . [preoperational] children [cannot] grasp metaphorical connotations of satirical cartoons or proverbs ([as shown in an experiment by] Shaffer,

1930)."

20. Only in this concrete-operations comparison era, that is, after age 7-1/2, can the child learn "conservation," that is, "the cognition that certain properties (quantity, number, length, etc.) remain invariant (are conserved) in the face of certain transformations (displacing objects or object parts in space, sectioning an object into pieces, changing its shape, etc.)" (Flavell 1963:245). [More consistently, English would term the conservation property as commutativity; cf. Oxford 1972 s.v.] Toward this mental realization of material permanence, an important mediator is the ability to annul: "Reciprocity entails not the outright elimination or negation of a factor but its neutralization, that is, holding its effect constant in some way while a second factor is being varied" (Flavell 1963:209-10). "For instance, where the problem is to study the separate effects of kind of metal and length on the flexibility of a rod . . . , the older child . . . takes two rods of different metals but of the same length . . . in order to study the effect of kind of metal, and two rods of a single metal and different lengths to study the effect of length." [Reciprocity implies mutuality even when one factor becomes more important than another. English would more consistently name this process as to permute, "to arrange (objects in a series) in all the possible ways in which they can be arranged. . . ." (Merriam 1961:1967).]

21. The permanence of material qualities is learned in a specific sequence: "The order of acquiring concepts of conservation of substance [cf. quality, perhaps including quantity], weight, and volume recurs in its entirety [even] in mental deficients," insisted Piaget (1947: 1950:154); "the last . . . is never found without the other two. . . ."

For such a non-simultaneous similarity of any kind of sequences, English already has a word, homotaxis. But, applied to intellectual sequences, the biogeneticists termed it a vertical decalage, from the French décalage, 'untuning.' Any of its subdivisions, they termed horizontal decalage (Flavell 1963:22). The latter phrase is particularly (e. g., in Boyle 1969:31) applied to this conservation sequence of concrete operations.

Within this subunit, the ages are also sequenced: "For Piaget's subjects, conservation of matter seems to become common at eight - 10 years of age, of weight at 10 - 12, and of volume only at 12 years and after. . . .

". . . . On this horizontal décalage . . . although this is not explicitly stated, one gets the impression that developmental reversals (e.g., conservation of volume achieved before conservation of weight) were rare or absent" (Flavell 1963:299).

That seriation claim has been echoed by the Helvetian's followers: "The general conclusion to be drawn from this [i. e., every Piagetian] line of research is that the sequence is invariant, but the ages may vary [slightly] with circumstances" (Adler 1965:1970:6). And each emergent skill generalizes slowly: "A cognitive structure, characteristic of that level, can first be successfully applied to task X but not to task Y; [yet] a year or so later . . . the same organization of operations can now be extended to Y. . . ." (Flavell 1963:22).

From these essentially physicalist learning claims, we may proceed to the structuralist's more social and summatory learning-claims.

22. One cannot learn social reciprocity before material reversibility. "The second characteristic process in the evolution of the idea of reality is the passage from realism to reciprocity. . . .

"All the younger children take their immediate perceptions as true. . . . [Thus,] the sun and moon are . . . following us [children] on our walks. . . .

". . . . . .

"Side by side with this [growing] realism of perception and images, there is a logical realism. . . . Before the age of 10, . . . the child does not know that he is a brother in relation to his own brothers. . . ." (Piaget 1927:1977:134).

"The reaction of intelligence at this level to the social environment is exactly parallel to its reaction to the physical environment. . . ." (Piaget 1947:1950:150). "To the age of about 7 - 8 years, . . . the

child is, therefore, not subject to a socialization of intelligence . . . ." (op. cit.:162). Only on attaining the social-life phase, "the child learns to adapt himself to others and acquires knowledge of his own mental processes" (Piaget as summarized by Lévi-Strauss 1967 :1969:91). "The key to this development is held [by Piaget] to be the appearance of 'social instincts' at seven to eight years."

23. The emergence of such social instincts provide a focus for objectivity. This is the essence of the decalage, according to the Helvetian's longtime colleague Henri Wallon (paraphrased in Voyat 1972-73:18): "For Piaget, the development of intelligence depends partly on the [emerging skill of sensitivity to] the social milieu; it is by means of socialization that intelligence becomes objective." Boyle added (1969:51) that "the ability to appreciate other view points means that the child learns to think in relative, rather than absolute, terms (for instance with respect to morality, justice, punishment, and so on). This means [according to Piaget] that the child of about seven or eight years is considerably more able than younger children to understand and deal realistically with social situations."

Hence the Swiss makes the younger years quite independent of sociability: "The Piagetian subject resembles Emil[e] ([hero of the same -titled book authored by] Rousseau, 1762), who is viewed as confronted with his physical environment only or, at best, with his peers . . . ," explained Aebli (1970:16). "Adults remain in the background. Interaction with, or guidance by, them is no part of the theory." (Later Piaget tried to patch over this claim, as we shall note.)

24. Learning social reciprocity enables the learning of rule behavior, diminishing egocentric behavior. In young childhood, "everyone plays the game . . . without much concern for or checking up on what the others are doing. . . . Nobody loses and everybody wins. . . .," in contrast to the way <u>adults</u> play, where there is "above all, a collective spirit of honest competition, so that some win and others lose according to accepted rules" (Piaget and Inhelder 1969:119, discussed in Cole and Scribner 1974:182-84). Furthermore, "adult play . . . ceases to be a

vital function of the mind when the individual is socialized" (Piaget 1945:1951:168, discussed in Sutton-Smith 1966:1971:332-33).

25. The learning of social reciprocity and rules must precede the learning of kinship. "The comprehension [level] depends on the particular stage of the child. . ," explained Sigel (1969:475). "For example, a child may use such terms as 'brother' and 'metal' very early. . . . For the concrete-stage child the word brother is defined [merely] as a boy 'who lives in my house.' For the adolescent, brother is a relational term defined in terms of kinship and interrelationship. To comprehend the concept of brother in all its relational significance requires the child to be able to employ the mental operations of reciprocity. . . . Thus, the limited definition of brother given by young children is due to immaturity in cognitive processes not just limits of vocabulary."

26. Commutativity plus reciprocity are the principles by which the child of this age learns operational mechanics: "[Only] from seven-eight to 11-12 years 'concrete operations' are organized, i.e. operational groupings of thought concerning objects that can be manipulated or known through the senses (Piaget 1947:1950:123).

27. From 11-1/2 through adolescence, there appears a formal-reasoning mentality: "Firstly, the logic of propositions, which is both a formal structure holding independently of content and a general structure coordinating the various logical operations into a single system. Secondly, a series of operational schemata [relating to probabilities, correlations, multiplicative compensations, etc.]" (Piaget 1955:1977:463). Our "definitional argument" construes this formal-operations talent essentially as inference from the ability that matured during the earlier era -- viz., as deduction.

28. This formal-operations ability now enables the child to "decenter" his innate egocentrism. Perceiving the perspective of others, he becomes more prosocial -- altruistic, generous, cooperative. "At the stage at which groupings of . . . formal operations are constructed, . . . the problem of the respective roles of social interaction and [=in contrast to] individual structures . . . arises in all

its acuteness. . . . [Only now] the more intuitions articulate themselves and end by grouping themselves operationally, the more adept the child becomes at co-operation, a social relationship which . . . involves a reciprocity between individuals who know how to differentiate their viewpoints. . . ." (Piaget 1947:1950:162).

29. These skills arise as the hereditary material matures. There emerge "successive logical structures that regulate thinking processes (see Piaget and Inhelder, 1969). The characteristics of these structures and their order of appearance are considered to be universal," summarized Cole and Scribner (1974:28) as the Genevan's overall scheme. "They are the outcome of adaptive processes between human organisms, whose biological heritage is the same the world over, and environments, whose fundamental physical properties (coordinates of space and time, behavior of objects under gravitational forces, and the like) are identical." The environment merely triggers them, not redirecting or resequencing them. "At the Institute in Geneva, cognitive development is seen as almost purely a matter of maturation," explained Sonstroem (1966:214). Added Greenfield (1966a:226): "While Piaget admits that environmental influence plays a role, the admission is [merely] pro forma. . . ." And where milieu cannot be deemphasized, Piaget tried to "biologize" it also: "It is in (what he considers to be) the first appearance of 'the social instincts' at or about seven to eight years that the key to intellectual development lies," explained Susan Isaacs (1930:1966:78). "Before this, the child is ego-centric. . . . After this, his thought lies open to the criticism of others, and thus self-criticism is awakened. And from self-criticism, logical judgment and ability to reason are born.

". . . But we are given no key to social development. . . . The social instincts . . . are, presumably, the result of some biological process of maturation of the nervous system and their roots are not to be sought in previous psychological [= psychocultural] happenings."

30. All conservation skills eventually emerge everywhere. Thus, "the famous Arunda [Aranda, Arunta tribe] of Australia . . . seems to indicate a systematic retardation in the formation of concepts of conservation, though these are eventually acquired. . . ." (Piaget 1968a:1970:118).

31. The decalage emergence-sequence is universal. According to Boyle (1969:114-15; cf. Piaget 1968a:1970:118), the Helvetian's diverse writings insist that, when we consider intellectual skills globally, "the order of their appearance is constant."

32. The intellectual evolution of a species is recapitulated in the development of an individual of that species. Furthermore, such mental evolution paces his physical evolution.

"The fundamental hypothesis of genetic epistemology is that there is a parallelism between the progress made in the logical and rational organization of knowledge and the corresponding formative [personal] logical processes. Well, now, if this is our hypothesis, what is our field of study? Of course, the most fruitful, most obvious field of study would be reconstituting human history. . . . Unfortunately, we are not very well informed about the psychology of Neanderthal man. . . . Since this field of biogenesis is not available to us, we shall do as biologists do and turn to ontogenesis" (Piaget 1968c:1970b:13, quoted in Turner 1973:354). This is, of course, Ernst Haeckel's "biogenetic law."

33. Therefore a primitive culture is a society that, like a juvenile, has not matured to the final intellectual stages: "Our belief [is] that the day will come when child thought will be placed on the same level in relation to adult, normal, and civilized thought, as 'primitive mentality,' defined by Lévy-Bruhl [1922]. . . ," promised Piaget (n.d.a:1928:256, quoted in Lévi-Strauss 1967:1969:88).

A related argument is that primitivity consists in collectivism, as argued in the mid-19th century by such proto-social scientists as Henry J. Maine. So civilization consists partially in de-collectivizing things: "In our [Occidental] societies the child, as he grows up, frees himself more and more from adult authority; whereas in the lower grades of civilization puberty marks the beginning of any increasingly marked subjection of the individual to the elders and to the traditions of his tribe. And that is why collective responsibility seems to us to be missing from the moral make-up of the [Occidental] child, whereas, it is a notion that is

fundamental in the code of primitive ethics" (Piaget n.d.a:1932:1948:250).

34. Therefore primitives are arrested in their development toward full humanity. "It is quite possible (and is the impression afforded by the known anthropological literature) that in numerous cultures, adult thinking does not proceed beyond the level of 'concrete' operations, which become elaborated in our environment between ages 12 and 15" (Piaget 1966:13, translated by H.G.B.).

Thus neither children nor primitives enjoy logic: "It is infinitely simpler merely to assume that the same genetic mechanisms which account for the development of the child of to-day were in action also in the minds of those who, like the pre-Socratics, were just emerging from mythological and pre-logical thought" (Piaget n.d.b:1951:1962:198).

". . . The more primitive a society, the more lasting the influence of the child's thought on the individual's development, since such a society is not yet capable of transmitting or forming a scientific culture" (ibid.). Hence, as noted earlier, Australia's Arunta are "retarded."

35. Since the skills arise internally and in a universal sequence, we must conclude that a child cannot be taught a particular skill earlier than it "naturally" appears. Now, Piaget was a researcher rather than an applicator, hence has suggested this effect indirectly. Thus, his fairly recent authoritative recapitulation (1968b:145) declared that "linguistic, educative, or social transmission, important though they are, can have an influence only to the extent that the child can assimilate what is offered to him into his own operational structures."

Such inability of schooling to accelerate assimilation-talent has been emphasized by Piaget's followers. Thus, "the longer we delay formal instruction, up to certain limits, the greater the period of plasticity and the higher the ultimate level of achievement. . . ," proclaimed the strong genetic-epistemologist Elkind (1969b:332). "Certainly, from the Piagetian perspective, there are 'optimal periods' for the growth of particular mental structures which cannot be rushed."

Likewise in the applications chapter of Oxford Univer-

sity's Piagetian Festschrift: "The teaching strategies advocated in this discussion are not intended to accelerate the child's development just for the sake of getting a child to do more and more, earlier and earlier, rationalized as preparation for a complex world. . . ." Instead, continued Sigel (1969:483), "undertaking these so-called 'acceleration' or 'induction' studies has value in order to assess the degree to which particular teaching strategies are compatible with the child's [already naturally-attained] development level. . . ." Thereby Piagetism found that curriculum should await aging, in what has become known as the "readiness approach." According to such doctrine, "the educator is confronted with an antinomy. . . ," mused Piaget's occasional colleague Hans Aebli (1970:16): "Up to a certain moment, he can (or should) not act, afterwards he need not any more -- [for internal] equilibration . . . does the business. This situation suggests a laissez-faire attitude to the educator. . . ." Biogenetics thus recommends a global calendar of mere skill-reinforcement. And if mental development is virtually spontaneous, then educationist intervention is inadmissible: "'Biogeneticism'," explained Petrovsky (1972:1973: 96), "became the psychological 'substantiation' for the pedagogical theory of 'liberal upbringing.'" And so the Helvetian scheme implies that enculturation cannot importantly be maneuvered.

36. Piaget's scheme constitutes an interrelated set of theory. "To put to experimental test the principal [Piagetian] epistemological hypotheses. . . . reveals the insufficiency of [previous researchers'] empiricism as an epistemological theory" (Piaget 1968b:147). Again, "most [other researchers'] theories of development . . . seek to explain [an isolated matter such as] new problem-solving. . . ." (Piaget 1968b: 140). By contrast, concluded his Encyclopedia chapter, "this entire body of [my] research bears witness to a single broad intention: to put to experimental test [as I, Piaget, here report successful,] the principal epistemological hypotheses about the nature of empirical and logico-mathematical knowledge" (Piaget 1968b:147). Indeed, he subtitled that article, "A Theory [that is, a unified plan] of Development." Such a set of correlated concepts would be called a "disciplinary matrix" by Thomas

Kuhn (1970:188-89).

Here, then, are the some-three-dozen critical propositions of Jean Piaget's paradigm of intellectual maturation.

CHANGING THE LOCUS TO THE CULTURE

Our critique of the foregoing decalage will follow the same sequence numbering, but via a quite different theory. Its fulcrum is not the individual but the interplay of micro-environment with the actual technology of its immediate human culture.

Vast is the difference between such a materialistic approach and Piaget's structural idealism. Yet, despite many piecemeal ecological attacks on the psychobiologist, we are unaware of any systematic materialistic critique of the scheme. Hence the present contrast need not enter into the debate now occurring between Marxist, Althusserian, "vulgar," and the many, many other versions of materialism.

When applied to human maturation, materialism would suggest begin with the above-cited interplay, which Harris (1975:156-57) termed the "techno-environment." We view it as ultimately controlling the social organization in a "Julian Steward Effect" (Burger 1977c :24]). And social organization in turn ultimately controls ideology in "the Hippolyte Taine Effect." Thus, East Africa's oft-remarked obsession with cattle, however scrawny, can best be understood in that while they contribute only a fraction to their economy's profit, they constitute the most maneuverable fraction (cf. Forde 1970:24-29). Such an approach reverses the causal sequence of the ideologists, who imagine that spontaneous concepts control the social structure, and it in turn controls the economic environment (Burger 1975). This viewpoint thus inverts any attempt (as by Piaget) to schedule behavior <u>from</u> person <u>to</u> culture -- a distortion that Burger (1978:185) decried as "psych-posterous."

An extreme example: Many Great-Plains Amerindian cultures exploited the buffalo, a beast so consumptive that it prowled in only small bands lest it eat out its own area. The Indians therefore also had to group in small numbers. And so they inculcated solitude, as through the Vision Quest ordeal for young men (cf. Harris 1968:666-70). (The

congregative Sun Dance was relatively rare.)

Industrial societies, better equilibrating their environments, conceal their enculturative economism through intervening institutions, such as school extracurriculum -- as, in a bourgeois society, a travel club. But economic role remains the ideology's hidden curriculum, and that is the core of cultural materialism.

When this theory-set is applied to intellectual maturation, it would suggest that local and specific techno-environmental opportunities govern the directions and sequences of mental development. This concept nullifies merely switch-on rocketry schemes, like Piaget's. Under the Harrisian approach, then, only those processes can be considered pan-cultural as can clearly be traced to specific brain functions of the human neopallium. And they (e. g., dieting rather than omnivorousness) turn out to be far too broad and variable to fit the Swiss skill acquisition (Burger 1977b). But the purpose of the present study is more to test (and disconfirm) Piagetism by ethnography, than to install cultural materialism itself. And so the present author's 13-page detail of the latter paradigm (Burger 1975) cannot further be repeated here.

DISCONFIRMATIONS OF CLAIMS 1 THROUGH 13

We may begin the analysis by subsuming the Swiss's first three claims. Using the same proposition numbers as assigned above, we recall that claim 1 is that certain intellectual skills arise as adolescent humans mature. Our "definitions argument," however, shows that the dictionary defines humanity as sapient, reasoning; adolescence, as immature adulthood; and maturity, as coming to full powers. Hence human adulthood means the development of rational intellect, and this proposition becomes axiomatic, overslipping the ethnographic scope of the present article.

But what of the related claim 2 , that the skills arise sequentially rather than simultaneously? - This too is truistic: Were it not so, then an "immature" human could not have obtained the talents a moment before birth, and would have to obtain all of them the moment after birth (Burger 1977a).

Somewhat subtler is proposition 3, that this skill-sequence, or vertical decalage, is a discovery rather than a predictable verbal accumulation. However, our "definitional argument" painstakingly explicates that the talents delineated for each stage are in fact all parts of the final talent of reasoning, and that each earlier talent is fully defined (= "nested") in each subsequent talent. Thus, the mind's ability to observe, developing in the "sensorimotoric" phase, necessarily precedes the observation-categorizing ability which emerges in the immediately-following "preconceptual" era. The fact that each phase can be described merely by specifying its addendum over the prior phase, shows that these too are nested definitions rather than truly experimental discoveries (Burger ms.) In other words, Piaget's first three propositions transcend ethnography, hence cannot be claimed as cultural-science discovery [1]

Proposition 4 was that logic and mathematics restore equilibrium to the growing individual. But an organism is definable as a life system (Merriam 1961 s.v. system). And a system is definable as operating "in unison or concord according to a coherent plan for smooth functioning" (ibid.). Cognition is defined as "an intellectual process. . . ." (Merriam 1961:s.v. cognition); and the adjective, intellectual, is defined as invoking "the higher [i. e., human-only] powers of the mind. . . ." (Merriam 1961:s.v. mental). And so growth does not unbalance an organism. Furthermore, anything that enters the intellect (not only mathematics but, conceivably, fine art) by definition auto-regulates the human, whether growing or static.

Claim 5 was that a new scientific theory always enlarges rather than destroying a previous theory. Part of this argument may remind us of Niels Bohr's (unmentioned) idea of (especially irradiational) complementarity. But broadly it grossly misfits the findings of a leading group of science historians, culminating in Thomas Kuhn's classic (1962), which appeared five years before this Piagetian claim: "The emergence of new theories [is a phenomenon that]. . . demands large-scale paradigm destruction and major shifts in the problems and techniques of normal science" (Kuhn 1962:67); examples

are "such paradigm shifts as the Copernican, Newtonian, chemical, and Einsteinian revolutions, . . . the wave theory of light, the dynamical theory of heat, or Maxwell's electromagnetic theory. . . ." (Kuhn 1962: 66). And, we predict, a cultural-materialistic interpretation of intellectual maturation, as opposed to Piaget's.

Kuhnianism, which is culture-wide, has its analogy in the individual's (bi)cultural shock: Each time an individual is exposed to a new culture, his cognition is likewise fractured rather than harmoniously enlarged. This report tells several such "discombobulations," as in counterclaim 16 (Nepal) and 17 (Kpelle).

Indeed, too speedy a change even within one culture produces mental conflict that has been popularly termed "future shock" (Toffler 1970). But Piaget's additive-equilibrium blissfully ignores these many levels of cognitive dissonance, whose frequence and intensity may rapidly be worsening.

Claim 6 was that intellect peaks in logic and mathematics. Here Piaget has Europo-centrically substituted a single ethnic cognition, or eidos, for the much wider possible range. While archeology reveals some sort of humans throughout about 3,000,000 years, Piaget's sort of deductiveness would disqualify all but those of the last two millenia. Yet "the concept of logic . . . ," complained Edward Hall (1976:1977:213), "is [simply] an invention of Western culture dating back to Socrates, Plato, and Aristotle." Indeed, the Piagetian mathematical paragon is both ethnic-specific and a mere three centuries old: ". . . Overintellectualizing at the expense of the nonverbal . . . [suddenly matures] in the 17th-century thinking of Descartes, who enshrined logic and, by so doing, achieved a dominant place in Western thinking. . . [although in fact] the irrational constitutes a significant portion of normal behavior" (Hall 1976:1977:216).

That pure deduction is no end-all should be obvious from the fact that it can occur synchronously, as in a mere computing machine. By contrast, human tradition is diachronic ("longitudinal"). Thus, among the Liberian rain-forest Kpelle people, Gay and Cole reported (1967:82) that "conclusion is almost never derived on a logical

basis, but on the basis of tradition and experience."

Piaget likewise seemed to confound the neurological meaning of rationality with its ethnic-specific interpretation. Where mechanisms of environmental control are not understood, it would be foolish to display rationality in secondary matters of control. There, solidarity may be fostered instead by symbolically invoking the supernatural -- by magic, which is technically anti-intellectualism. Thus, according to Reo Fortune (1932:275-76), the seven-year-old child of Dobu, New Guinea, would eagerly learn such lore as whom to charm, and how much of that magic to blurt if subjected to even hours of inquisition. This 'voodoo' seems ultimately productive of group adaptiveness, not disintegration.

Again, illness strikes humans randomly, but that fact must not be permitted to pit one society's victims against its fortunates. And so we find virtually all cultures investing their healers with charisma. Thus, a Hopi Amerindian aged about four would often be told to "go out to the Antelope shrine and look for my deer people who were invisible to ordinary human beings." And soon "I could see those deer while others could not. . . . My grandfather or parents would remark that I . . . would probably use my special power soon to heal some poor person who was sick and unable to urinate" (Sun Chief, in Simmons 1942:66). But Piaget disqualified such communal 'irrationality,' siting reason in the individual.

The second half of claim 6 was that individual intellectual skills are the major ones for survival. Thus Piaget was assuming them to be the unilinear goals of maturation. But they are so only in very individualized (and especially commercialized) ones like his own Switzerland. Yet in many other cultures, the early learning of sociability is of equal (or even greater) importance.

Hence culture considers far more subtle and long-range factors in group survival. The resultant optimalizations must be understood by the masses, however, and so become pidginized. Thus, the legends that prevent overcropping among the New Guinea Maring are irrational (cf. Harris 1974a:35-57), yet efficient. And we can sense the Occident's simplistic cost/benefit system (cf. Burger 1972b) even

now being dethroned by a similar mysticism among conservationists within industrialism, as witness events like the recent advocacy for the great white whale.

Besides supernaturalism, another nonintellectual talent of grand survival importance is sociability: Two same-aged children may appear intellectually equal, and yet only one may think to request, receive, and/or assimilate help on advanced problems. Hence Lev S. Vygotsky and Aleksandr R. Luria (discussed in Boyle 1969:129) suggested that Intelligence Quotient (I.Q.) should include the variable of skill in soliciting adults. But social solicitation is a factor transcending merely personal interaction. It is partially structured by the type of ethnic communalism. The psychologist Porteus, for example,

(1931:308) sought to impose that most individualized Occidental activity, the intelligence test, upon some Australian aborigines,

But they raised objections: (1) Any impacting problem must be referred to their native Council, not to individuals. (2) Since Porteus had been elected an honorary tribesman, this experiment obliged him to assist the Council in solving the very problem he had raised! Indeed, Piaget's prejudice toward mathematics and physical science reminds one of the modern Euroamerican bureaucrat who reassures his chief that "every quantitative measurement we have shows we are winning the war." And a mere decade ago, just so 'logical' a report helped commit the U. S. President Kennedy to deepening the wavering Vietnamese War, according to Brandon (1969:21), when those very words were penned in 1962 by Defense Secretary Robert Strange McNamara. Such Europocentrism measured Asian bridges bombed, but not souls indoctrinated. It is but a logical extension of Piaget's mechanical overemphasis on policy mathematicization. (And the society which obeyed it lost the war!)

Tradition acts, then, as the immediate constraint to allow for long-range, subtle variables that a culture comes to rationalize only very slowly if ever

(cf. Harris 1974a:257). This cultural-materialistic holism differs fundamentally from Piaget's enshrinement of pure, individual deduction as the climax of hominization.

Claim 7 was that each skill cannot emerge before a certain age.

But the present critique shows (depending on how one categorizes each case) at least half a dozen gross disconfirmations. For example, the proposition that social reciprocity cannot arise before the material -reversibility of age 7-1/2 is rebutted with documentation below (in counterclaim 22) as occuring much earlier among the Chagga, perhaps as early as two.

Curiously, recent years find the Helvetian himself weakening the meaning of his own age specification by vaguely perceiving the reality of cultural intervention: "One can characterize stages in a population by a chronology, but this chronology is extremely variable; it depends on the previous experience of the individuals, and not only on their maturation. . . ." (Piaget 1955b:1977:815).
Alas, chronology is "the science . . . that assigns to events or transactions their proper dates. . . ." (Merriam 1961) -- so Piagetian chronology's claim is unique in that it is non-chronological.
His age-specifics are blurred both by ethnography and by the plaintiff Piaget, and the gap is not specified. So we end with another empirical conglomeration, another non-theory.

Claim 8 was that after the biological threshold of age has engendered a skill, it is actuated by a particular type of environment. But "multi-stage rocketry" does not correlate those actuations with any sociocultural regularities. Yet much non-Piagetian evidence suggests just those variables, such as the sexual division of labor in horticulture as opposed to that in agriculture.

In Beirut, Lebanon, for example, youths were shown inequalities both in parallel rows of wooden cubes and in bottled-liquid levels. When identifying those variations, and revealing commutativity, the boys significantly out-
performed the same-aged girls ($p < .05$) with the blocks, but not with the liquids (Za'rour 1971:171). That finding misfits biogeneticism's attribution to mere uniform aging, even within a single community.

Now, Za'rour noted that Lebanese boys are traditionally allowed greater exploration than are girls. Such a matter can probably be refined with non-Piagetian milieu factors: Are fuel briquets normally fetched by boys? Are girls familiarized with liquids

rather than briquets by being assigned normally to bottle (let us say) oils? - Suggestively, Amar (1954,discussed in Henry 1960:291), reporting the activities of three-to-seven year old Egyptians, found that a boy would fill water-pots, whereas a girl would carry a water-tin on her head to the site where she'd moisten it for kneading into a loaf.

Such milieu micro-variation, frequent in behavioral-science literature, readily disproves the decalage's reliance on mere chronology. 'Environment actuates after age enables, needless to say' is really Piaget's disclaimer of ability to explain the disconfirmations of his own previous and fundamental allegation, which claimed to relate definite skills to definite instrumentalities. It simply expunges biogeneticism's criteria against possible testing.

In this connection, we remember Harris's protest in a different matter: To offer exceptions to rules and later to add exceptions to those exceptions, is non-science (Harris 1974b:243-44). This duplicity can be perceived if we make an astronomical analogy about the Earth-centered Ptolemaic system; Surely a Ptolemaist would not be permitted to enlist the additional advantages of Sun-centered Copernicanism. He could not suffix data disconfirming geo-centrism with a bald concession that "of course the Sun may also control the Earth's revolutions!" Yet the Helvetian has been claiming the benefits of both, mutually-exclusive, maturational origins - biogenetic yet culturological. Nullifying the predictable relationship that must underlie a scientific proposition, that maneuver trivializes the aging-per-skill which is a decalage cornerstone. Biogenetic advocates simply neglect anthropology's discoveries of the primacy of socioeconomic variables. Here, then, is the reductionistic flaw of Piaget's trying to principle symbolers via a sub-symbolic theory. And now, with this exposure of the illogic of a general biological basis, we may proceed to criticize its age components more specifically.

Claim 9 was that sensorimotorism arises in the human from birth to age 1-3/4 independently of language.
Growth "medullates," or connects nervous tissue in, the baby, which

becomes myellinated in a sheath of fat acting as a kind of electric insulation around the baby's nerve fibres. This apparently brings the uniquely human brain's angular gyrus into functioning as a "switchboard" (cf. Geschwind 1972). The uniquely human language which results is clearly the instrument of human culture (cf. LaBarre 1954:X). Since our argument concerns the intellectual aspects of maturity, which we claim are ethnic-specific rather than pancultural, we have no quarrel with Piaget's pre-linguistic claims. We would, however, indicate that adult culture does modify the forms and ratics of sensorimotoric activity, as in the age of sitting erect (Kilbride and Kilbride 1974:94,100); the cooing (Caudill 1972:table 7; 1973:70-72); motoric smoothness (Freedman & Omark 1968:1973:270); walking (the LeVines 1966, discussed by the Kilbrides 1974:89), etc. However, Piaget's sensorimotoric claims are so Cartesian and so un-disconfirmable that they should accommodate the aforementioned kinds of variation.
His detailed descriptions far exceed those of earlier scholars (such as Herbart 1835:1971:54), and so we gladly acknowedge Piaget's superb descriptivism at this glottogenic, sub-cultural stage.

Claim 10 was that preconceptual categorizing arises from 1-3/4 to four. The tot is then changing from a presymboler to a symboler. And culture is a symbol-based phenomenon. Hence we cannot yet expect great ethnic differences. Even despite the Swiss claim's modesty, however, we find that some cultures begin important visual classification earlier than the alleged 21-to-48 months.

The child of this age is usually a toddler in Yankee-land, having so begun at around 13 months (Ilg and Ames 1951:1955:30-31). But low-energy societies generally autonomize their child much sooner. He must quickly learn the often subtle differences between boons and poisons. One sprout may be a mushroom; a similar one, a toadstool. And the very first error may kill the student, preventing further lessons. Thus, Schapera (1930, quoted in Newton 1967:157) reported that South African toddling almost corresponded with adult foraging: "From the moment it can stand on its feet," the Hottentot child was taught by its mother to identify and extract edible roots, discover

wild honey, and catch and roast juicy lizards and mice. Here, then, long before Piagetism 'permits' it, is preconceptual -- perhaps even partially conceptual -- image-matching.

Claim || was that preoperational subjectivizing arises from age four to 7-1/2. Here is another psychobiological vagueness. At most, it seems to mean the studying of a category in a phenomenological way, not confusing subject with object. But such perceptions are not solely within one skull. They depend on cultural factors like the degree to which a child is integrated with adults, protected by them, challenged verbally by them, taught magic, etc.

Consider, for example, even Piaget's own Occidental world. Unlike the aforementioned Hottentot foragers, the bourgeois society tends to segregate children from economic contribution. Yet its mass media blurt some facts indiscriminately, such as sex and crime, which other cultures may shield by age-grading. Hence a given society makes a child exhibit comparative egocentrism in some respects, and comparative sophistication in others. And the evidence indicated that his subjectivity is indeed ethnic-specific: "Serious errors in the understanding of the structure of a child's speech [have been] introduced . . . by Jean Piaget, . . . according to which the language of children, even beyond the sixth year, is 'egocentric,'" complained Jules Henry (1971 : 30). But "our records of hundreds of hours of observation of [three-year-old Yankees'] nursery schools at all income levels disclose . . . in children's conversations . . . no distortion in which the actor becomes the acted upon and in which attributes are irrelevantly displaced. . . ." Children are imaginative -- but their imaginations are shaped by their culture. Thus, when a three-year-old shouted, "Look what I did to the ghost," his three-year-old playmate spontaneously reassured the adult observer, "There wasn't a real ghost!" (Henry 1971:31).

Subjectivity follows cultural interplay, not growth hormones. "The untrained, undisciplined and ignorant mind is, of course, ego-centric, precausal and magical, in proportion to its ignorance and lack of discipline," objected Susan Isaacs (1930:1966:94). "But . . . not . . . be-

cause of its ego-centricity -- [contrarily,] it is ego-centric in large part because of its ignorance and lack of organized experience." Hence the ideology obeys the local social organization and livelihood patterns. As for the children as young as three who play all about, insisted Jules Henry (1971:30), "our ears are filled with their [realistic] social, not egocentric, language, ... [so the misinterpretations] can only be because we [bourgeois] think of our children as so troublesome and demanding that we regard them as egocentric. . . ." Not brain synapses but the age-grading of industrialist specialization makes childish activities appear egocentric.

That subjective reality is not absolute but ethnic-specific is seen similarly in the definition of hallucination. Ninety percent of Anglo psychiatrists attributed "hearing voices" to craziness. Therefore they tended to doubt the 75% of Spanish-American children who, when instructed to compose a fairy tale in classroom, reported the frightening and poignant nighttime cries of one "La Llorona." Yet the same physician residents, complained Padilla and Ruiz (1973:31-33), would think it normal for Anglo children to gossip at Christmastime that they believed in skyborne sleds chauffeured by eight reindeer to the command of "Hi-ho!" But surely the Chicano myth of La Llorona, an abandoning, now guilt-ridden mother, need not hallucinate youngsters any more than the Yankee "Santa Claus" (whose magical amassment of merchandise might in more "primitive" cultures be termed "cargo cultism"). So Piaget was attributing to horology, the subjectivity that is actually ethnic-specific.

Nor can the present author stop with this disproof that this age-group's mentation is 'subjectivity.' We further deny that it is in the age itself. Rather, Occidental cultures impose on children-under-7-1/2, certain institutions that far more readily explain their mental changes. As Cole and others protested (1971:28), "both European and American developmental research[es] are limited by the fact that in these two areas of the world all normal children begin to attend school between the ages of five and seven years. This is the same age at which certain crucially important increases in children's intellectual capacities have been repeatedly noted (cf. Piaget, 1955; . . . .). . . ."

In other words, the subjective development that the Helvetian attributed to internal biochemistry is more likely obeying extra-domiciliary contacts -- especially the discipline that is readying children for their eventual workplaces: not the "dawning of genes" but the "donning of [blue] jeans." For such reasons, Piaget's claim of a uniformly-aged emergence of attribute subjectivity is not confirmed.

Claim 12 was that the externalization of power makes games and other rules seem sacredly inflexible. But ethnography dispels such simplification. In the Philippines' Tagalog provinces, for example, Stoodley found (1957:244, 249) that small boys played basketball without ruly sequencing or scoring. Attaining teenage, they did not make the regulations more flexible, as Piaget had hypothesized; rather, they straitened them. And so "the data suggest that the [gaming] stages reported by Piaget . . . ['s book], The Moral Judgment of the Child [n.d.c:1932] . . . would not appear the same in the Philippine setting."

Why this disproof of "switch-on rocketry"? - Cultural materialism would research the probability that the Tagalog community was exploiting basketball for techno-environmental needs, both as a muscle-developer and as a team socializer. Teen Tagalog probably needed more in-grouping, hence rigidified their rules as a boundary-maintenance. And from such an example, we must doubt universal rule-desacralization.

If game inflexibility were mere switch-on, furthermore, we should expect persistence even when a second culture intrudes. Alas, it causes change. We may consider, for example, the 1940-era comments of mixed-age children in the isolated Navajo community of Navaho [n. b.] Mountain: Three-fifths of them knew games both of their own Amerindian group and of the encroaching white society. They unanimously declared that the Navajo-game rules had been determined by the holy ancients, hence could not be changed. But, Havighurst reported (1957:1967:659-60), they added that marbles and other Whiteman games had been formulated by specialists, hence could be changed by the players themselves. For such a double standard, the decalage offers no explanation. But anthropology can easily reinterpret the

'schizophrenia' as simple biculturalism, or milieu-effect of a second, equally non-genetic force. And such instances fairly shout that canons are zeitgeist-specific, rather than a global teenage profanation as imagined by genetic-epistemology.

Proposition 13 declared that consistency of rule application aids self-awareness development. Here too, however, the Piagetians were emphasizing a biological hermit at the expense of Social Person. For self-awareness is not entirely internal. Rather, it means the perception of one's place within his milieu.

Now, every society enculturates children, whether or not formally, "because of the necessity to establish predictable responses in human beings in their proper context" (Jennings 1966:1968). And so conscience and predictability reside in techno-environments. Among the Gold Coast (now Ghana)'s isolated Tallensi (Tale), for example, lying would mislead one's associates, and would soon be exposed by the realities of the rebounding milieu. In consequence, Tale considered a falsifier as a mere fool. Thieving, by contrast, caused immediate and sometimes permanent damage. Hence, reported Fortes (1938: 38), Tallensi detested a thief, but merely twitted a liar. A somewhat similar but broader interpretation appeared in David Riesman's (1950) well-known thesis that milieu differences cause conscience to be tradition-directed in one region, but either inner-directed or other-directed elsewhere.

Instead of emerging like Spansules, then, rule normalization paces the economy. A market culture, for example, thrives with standards of weight and measures, which facilitate transactions. Presumably in consequence, middle-class Yankees have found that "training has included a stress on consistency and truthfulness" (Friedl 1962:1967:156). Piaget's Switzerland was also a commercial leader and thence, no doubt, a predictability inculcator.

By contrast, many communities have little control over their environments. Weakness may characterize their technology or boundary -control. Under such conditions, practicality outweighs absolute truth. Thus, Navajo Amerindians might lie to White strangers -- but not among themselves (Kluckhohn and Leighton 1962:296-98).

Since adult standards of consistency are ethnic-specific, we should expect their system to enculturate with similarly local relevance. There is no reason to believe the "rocketry" argument that self-awareness, presumably implying maturation, is always aided by consistent adult treatment. In fact, cultural materialism suggests that a precarious community would darwinistically teach the survival value of skepticism itself. We might expect it to inculcate spontaneity and coping-behavior, so that the entire populace constitutes one Outward-Bound school cohort.

Ethnography instances such realities. In the undeveloped Alor area of Indonesia, DuBois reported (1944:65), children were often sent on wild-goose chases. And Ifaluk, Micronesia, pampered a baby only until three; then, advised W. Stephens (1963:364), it was abruptly ignored and bereft of affection.

Similar inconsistency characterized a hard-pressed Greek community: In Vasilika, deception was justifiable both toward fellow villagers and toward strangers. In that ponyiros ('cleverly bad') ethos, enculturation teased and frustrated a child. For example, a mother would yank her nipple from her would-be suckling, readmitting it to the well only after squirmy whimpering. Meanwhile, three-year-olds Vasilikans were incited on each other by 10-year-olds, who would recompense each spat with a hug rather than a slap.

This inconsistency training apparently worked consistently: A three-year-old Vasilikan would hit a tormentor. By five, however, he'd instead shuffle stolidly away. Later, grown to adulthood, the Greek would actually expect to be hoodwinked (Friedl 1962:1967 152-56). Indeed, he would protect only a deception's success, not its attempt. We see, then, that rule consistency is not the global virtue as imagined by psychobiology. It is merely techno-environmentally specific.

DISCONFIRMATIONS OF CLAIMS 14 THROUGH 24

Claim 14 was that the preoperational child evaluates defiance or immorality by its material damages. This proposition is but the truism that an inexperienced person judges by the phenomena

he senses rather than by more profound concepts. Even here, however, error abounds. Experience itself is the product of culture. A child's actions are not based on its own analysis alone. Rather, societal adaptiveness is calculated diachronically instead of synchronically. And so the symboling unit, the culture, shuns impetuousness. Instead, it gradually evolves systems and institutions that subtly consider cost/benefit of the various behaviors over several generations. Culture is, in a word, actuarial.

Juvenile behavior is everywhere mediated by adults. There are really no independent youngsters' worlds, no Lords-of-the-Flies. Adults therefore impose eventual recompenses as early as possible, all the more on young children who cannot pre-calculate them. Even the instant-response psychologist Burrhus Skinner ultimately (1971:173) came to perceive that "the main effect . . . of the social environment called a culture . . . is to bring the individual under the control of the remoter consequences of his behavior." Hence when a very young child learns ethnic rules, he is internalizing eventual effects, whether or not he understands their causality chain. This situation belies the biogenetic criterion of mere phenomenological effect.

Consider, for example, injury to an eye, and the years of blindness and stumbling that it might cause its victim. Society does not allow the child to learn this payoff by trial-and-error. Rather, it makes symbolic statements ("naughty. . ."), and may even dramatize them before damage is perpetrated. Thus, according to Wolcott (1973:130), a suburban Pacific-Northwest elementary school official would occasionally find a student (age range from about 5-1/2 to about 14) throwing rocks despite the lad's previous conviction on a similar offense. Whereupon, regulations would require the culprit to spend an entire day wearing a patch over his eye, vicariously to experience his potential damage. Such highly humanized treatment belies the decalage allegation that the pre-7-1/2-year child evaluates disobedience only by his lone reckoning of its material damage.

Nor is such delegatory experience limited to complex cultures. In the U. S. Southwest, a six-year-old Hopi babysitter briefly left her younger

sister to play. Her truancy was discovered. Her mother's brother lectured her. The community continued to provide her usual sustenance, as in feeding her. But it did not dialogue her for 10 days. Thereafter it resumed normal sociability, without twitting. Yet some 35 years later, the culprit reported (to D. Eggan 1956:1963:331-32) that the shaming still evoked nightmares: "I wake up in a cold sweat." Thus Hopi adulthood equated a few minutes' abandonment of an infant beneath the desert sun with a three-dozen-year hex on the evildoer.

In fact, prediction is inherent in culture (and thus contradictory to decalage emphasis on independently childly reasoning). We find societies developing rules even when those collectivities do not consciously understand their reasoning. Thus, in India, the elite Brahmins raged against the system of ahimsa, 'life-sanctification,' under which lower-classes' cattle could poach their fields. But, explained Harris (1965:225; 1974a:25-30), the system must be evaluated pan-Indically: It was helping provender those beasts for their otherwise powerless owners. And that 'irrational' tradition thereby enabled lower-caste survival, and the densification of the subhuman and human biomass, which is a major element in Darwinian success.

Such ecumenical analysis trivializes the genetic-epistemological claim that the under-7-1/2-year child autonomously evaluates offenses simply by the damage immediately visible to his eyeballs.

Claim 15 was that ages 7-1/2 to 11-1/2 develop a "concrete -operations" mentality which maneuverably decenters, or objectifies, the previously preoperational era's subjectivity. Such terms are, however, so vague as almost to defy verifiability.

The ability to arrange sequentially, for example, need not reflect reasoning as such. It may merely be a function of memory, which is certainly ethnic-specific rather than global in its modes and contents. Thus, a New Jersey experiment tested six-year-olds in mental-sequencing ability. It varied three types of feedback: visually afterwards, visually during, and verbally afterwards. Their correct responses (94%, 95%, 80%, respectively) were 18% greater when visualized than when verbalized (Trabasso and others, in press: Table VI). Similarly, when four -year-old Californians were taught numbers each asso-

ciated with a color, they improved their ability to convert cardinal (absolute) into ordinal (sequential) numbers (Hoffman and Trabasso in press) -- the type of memorability that seems to underlie transitive inference.

The difference is significant: The Swiss had implied that reasoning is a product of mere multistage rocketry. But experiments such as those just cited reveal the ordinal-memorizing factor to be adjustable. Hence it can be maneuvered by a particular techno-environment.

And each culture does determine the items to be objectified and their priorities. Thus, despite the structuralist's claim of commutativity's automatic appearance, it rarely surfaced in Hyde's (1959) tests of Aden (Middle Eastern) children -- as the Piagetian Flavell had to concede, though without explanation (1963:387): "Genuine transitive inference regarding equality of weight appeared to have been a rarer event in her sample than in [J.] Smedslund's: only five of her 144 subjects seemed to have anything like a transitivity principle in their cognitive armory." A society like Aden can, then, fail to develop what the "Spansule" theory found normal in the 7-1/2-to-11-1/2-year child of commercial Switzerland.

For the transitivity aspect of decentering concreteness does not reside in mere actuation switch, but in world-view. A person or a culture that controls its environment weakly -- a classification certainly fitting the young child -- tends to express ideas intransitively. This principle inheres in Benjamin Whorf's classical analysis (1956:1975: 287), which illustrated with the example that the Nootka Amerinds of Vancouver Island combined into one form, both the passive "A house occurs," and the potentially active, "It houses (something)."

By the same token, an engineering-dominated culture could develop concreteness earlier or farther. And diverse societies do reveal these variations: Certainly the objectification of "concrete operations" would produce recognition of spatial relationships beyond ego's bodily parts. Contrast, for example, the concept of edge with the narrower concept of (ego's) finger, which is ego's own edge. We find definitive recognition of even the broader

idea occurring much earlier than 7-1/2. Thus, a Soviet syllabus for mere three-year-olds (quoted in Waddington 1963:66) required the cutting out of paper, and its placement over distinctively-colored sheets, "learning the name triangle, edge, corner, middle." This was the norm for three-year-olds in a 250-million population, and we may therefore reasonably assume that many of those youngsters were indeed meeting its schedule, and thereby helping trivialize Piaget's supposition of objectivity's delay till after 7-1/2.

Claim 16 was that young children are everywhere animistic. Our first disproof comes from the simple ethnographic fact that children imagine such indwelling spirits in only some cultures. Thus, four types of measurement in Manus Island showed Margaret Mead that even young children impersonalized their Melanesian universe: 30,000 of their drawings revealed not one anthropomorphism like a smiling Moon (Mead 1930:131-33). (Dennis [1943:1970:320] attempted to disconfirm Mead by a survey questionnaire, but it used such ethnocentric categories as to vitiate any findings.)

Perhaps even more significant for a Popperian evaluation of Piagetism is more recent psychobiological treatment of this classic fieldwork disproof by Margaret Mead: The Modgils' compilation of Piagetian research discusses fully 68 studies in its Animistic Thought, Imagery, & Memory section (1976:II 73-166). Almost all are psychologistic and favorable or inconclusive. It does not even list this central anthropological disconfirmation!

So much for static disproof. But disconfirmation comes also in dynamics. Now, life-span and aging are essentially biological functions in a species's genetic structure. But beliefs are not body-bound. Instead, they are (in the present author's cultural-materialistic paradigm) the agents of social organization, and ultimately the handmaidens of livelihood. Hence beliefs change with sociality changes. And that flexibility need by no means be contemporary with "objectivity."

That magical thinking changes with culture more than with physiology is even clearer when we consider situations in which one culture is being impacted by a second. "Multistage rocketry" makes no allowance for ac-

culturation. But our materialistic argument emphasizes that learning patterns must change to fit techno-environmental needs. Hence our theory automatically adjusts for the relative (political, etc.) strengths of the the several interactors (cf. Carnoy 1974:95-103). An analogy appears in linguistics, incidentally, where the multiplicity of impacting dialects has engendered the theory of diglossia (Ferguson 1959).

An example recently appeared in western Nepal. There the traditional schooling was invaded both by school modernization and by army technology. Outside researchers queried the results. They discussed phenomena with Chettri students from nine to 14, that is, from the alleged phase of concrete-operations to that of formal-reasoning. The youth did not offer a monadic or replacive explanation, so much as a dual (additive) one. They first explained earthquakes traditionally: "The earth is supported on the back of a fish. When the fish grows tired, it shifts the weight, and this shakes the earth." Then came their addendum: "There is fire at the center of the earth. It seeks to escape and [so] sometimes cracks the earth" (in Dart and Pradhan 1967:651). Such ambivalence cannot be explained by a "Spansule" concept, but by realpolitik.

Proposition 17 argued that the child's animism is "decentered" away with age. Not so, for animism (or its absence) is a product of techno-environment rather than individual age, hence obeys its causative ecological/economic constraints.

The aforementioned animism, as an example, sometimes appears as a part of guardian-spirit philosophies. And in certain milieus, animism may become more important as a person ages, rather than less as Piaget alleged. Just those tutelary beings were systematized by some Amerindian groups. Among the Hopi, in consequence, "certain of the characteristics which Piaget thinks are developmentally [peaked] early do not decrease with age but may actually increase" (Milton Singer 1954:185, summarizing Havighurst ms.). Indeed, we may indicate an analogy: The divine, virgin birth of Jesus Christ, whose objectivity is doubtful, probably inspires as many aged as juveniles.

And, at the other end of the techno-environmental spectrum, the "most advanced" scientists are designing ever more

intellectual capacities in machinery. So many adults have been anthropomorphizing computers that the largest manufacturer, charging millions of dollars for a machine that it does not want equated with one small portion of a "cheaper" human, has been waging a war for years, as when it directed its employees, "Machine orientated terms with any human connotation will no longer be used . . . . giant brain, eye, or thinking machines. . . ." (Bormann 1960:i). But by neglecting techno-environment in explaining anthropomorophism, Piagetism classifies these ultra-modernist adults as primitive, animistic children.

And, rather as in the Nepalese case described above, the incursion of transculturative forces further weakens the alleged global chronology that Piaget imagined as the basis for animism-vs.-realism. Thus, a Kpelle man accepted local tradition that a particular spirit-tree had in a single day been both dismembered and then self-reconstituted. But, reported Gay and Cole (1967:35), that particular Liberian had been to college, an alien institution. And (so) he simultaneously believed the Occident's biological paradigm, that trees, like other complex organisms, mature slowly and on dismemberment die irreversibly.

Still another very similar instance of this biculturation appeared in the Navajo-versus-Anglo game rules in counterclaim 12.

This is "double-think" rather than the single-brain endogeny we would expect if Piagetism were universal. It cannot be explained by biogenetics. But it becomes transparent if one perceives that learning reflects the imposition of each specific milieu.

Claim 18 was that enumeration must precede commutativity. Now, enumeration, as one part of mathematics, constitutes a kind of logic; it is self-proved rather than environment-proved, hence is not science. In fact, it is especially ethnic-specific rather than objectively observable. And Piaget's very definition of intellection was thereby unconsciously favoring the quantification-emphasizing cultures. Such prejudice, Margaret Mead bantered (1953:1956a:92), would exclude from the attainment of commutativity, all societies normally cognizing merely small numbers.

Thereby this very claim disqualifies many cultures from

interchangeability and thence from rationality. For example, the New Guinea Arapesh termed all units above 24 as simply 'a lot' (op. cit.).

Even "worse," a central-Australian aboriginal group subsumed everything above five as "Big Mob" (Dasen 1973, discussed in Cole and Scribner 1974:152). And the Yąnomamö of Brazil/Venezuela used merely binary counting, in which three was expressed as 'two-one' (Chagnon 1975:209; the same for an unspecified Australian group in Service 1966: 67).

But in his enumerative emphasis, Piaget had been prejudiced by his Euroamerican surround -- the very mania which Pitirim Sorokin had once (1956:102) denounced as "quantophrenia," and aptly demonstrated by the Vietnamese War quantification mentioned in counterclaim 6. The Occident Occident can even designate the number 10, followed by fully 100 zeroes, by a single word ("googol"). Our Big-Number glorification should not, however, blackball the better-balanced societies. The extent of numeration does not indicate intellect, but merely the massiveness of a society's techno-economic relations. If a small group markets anything, even cow-dung patties, it will likely do considerable counting. Yet should that group be isolated, it need not waste its time amassing or counting identicals, for its use-pattern will probably be on-demand rather than warehousing. Commodity objectivization is, then, not ubiquitous. By contrast, Laura Bohannan found (1954:1964: 16) that in Nigeria's Tivland, "every . . . child knew . . . a name and a use . . . [of] literally hundreds of plants . . . [rather than having been crammed with Occidental algebraic logic, so that] for the first time in my life . . . ten-year-old children children weren't my mathematical superiors."

A related argument of Piaget (with references in Vanwagenen 1973:30) is that a child must mature to commutativity before learning to measure. But P. Y. Gal'perin and L. S. Georgiev exposed kindergarteners both to that authoritative sequence, and to its reverse. And they found the taboo arrangement producing twice as much conservation (op. cit.:31).

In sum, adults of every culture are obviously familiar with commutativity in practical life, and yet not all have the complex enumeration demanded by "multistage rocketry." But should Piaget still deny

this, he would then be refuting his other argument (claim 30) -- that all conservation skills eventually emerge everywhere!

Claim 19 was that only with concrete operations (beginning at 7-1/2) can a child compare sufficiently to interpret metaphor. But once again genetic-epistemological absoluteness fails. For the ratios of the several speech forms (such as prose versus metaphor) are ethnic-specific. As LeVine noted (1973:237), "the use of proverbs in conversational speech, common in many African cultures, is an example of an institutionalized form of primary process representation." And not only the usage, but even the metaphoric content, are products of eidos, the ethnic-specific apperception, rather than a body-bound homology. Thus, "to carry coals to Newcastle" would be meaningless in a tropical desert.

Conversely, a culturally important lesson will be publicized at an early age, often via pithy or rare words. The Ngoni of southwestern Africa, for example, would gentle their admonitions by translating them to metaphor. Thus, when a child uncouthly smacked his lips at dinner, a fellow diner mocked, "I hear the guns of the Tyandla people booming!" The participant-observer (Read 1968:38) reported that this child, aged perhaps three, thereby "learned that a proverb could be a veiled rebuke, and he hung his head, ashamed." And so the understanding of metaphors, which also are history-specific, obeys zeitgeist rather than 7-1/2-year "Spansules."

Claim 20 was that only in this concrete-operations era (after age age 7-1/2) could the child learn the permanence ("conservation") of material qualities. Thus, Piaget had often stated (as cited in Estes 1956:221) that the number of marbles in a thinner, taller jar would be considered greater than in another jar by the pre-concrete (under 7-1/2) child.

Alas, to learn interchangeability is important only when actual interchange is important. For example, most but not all communities boast markets. Some but not all dispatch their children to trade there. Hence cultural materialism would expect commutativity to increase in such areas. Thus, among middle- and lower-class Kentucky children, 71% of the four-year-olds, 75% of the five-year-olds, and 100% of the six-year-olds

perceived the transferred-marble quantities identical: "It looks like more . . . [but] it's [merely] 'cause this jar is taller. . . ." (Estes loc. cit.). The mass media, not hormones, had probably made those Yankee children see through merely superficial equivalence. And further impetus toward learning commutativity would come in any society undergoing rapid change. There, the old could be correlated with the new by the particularly permutative types of logic, such as "algorithm" and "heuristics" (cf. Thomas Gladwin 1958-59:1960:27-29).

Still other cultural factors control conservation mentality and obviate a switch-on rigidity. In particular, mass production is economized by designing proportional products, as in making dies modular. Hence, as Bruner explained (1966b:325), in a manufacturing society, "there is an insistence on mapping each of these systems into another, with a resulting increase of the translatability between each of them." Interchangeability mentality obeys techno-environment, not enzymes.

Claim 21 was that the comparison-learning child would begin around 7-1/2 to learn the permanence ("conservation") of material qualities in a specific sequence, viz., substance [presumably meaning quality and perhaps quantity], then weight, and finally volume.

Now, the opposite of substantials is insubstantials -- like ideas, which by definition weigh nothing and can fill no space. Hence the Weight/volume can, then, never occur before substance. Hence the relation between two of the three parts of the claim is definitional, not disconfirmable, and thus bogus.

Cultural materialism must rebut the full claim, however, because it implies a global priority of significances without considering how micro-environments might vary those precedences. Thus, Hyde (1959) tested Aden children in the conservation decalage, but "found a number of subjects who departed from the predicted sequence by conserving weight but not global quantity, volume but not weight, and the like. Careful scrutiny of these studies," Flavell lamely concluded (1963:387), "does not suggest any immediate explanation for the [Piagetian] discrepancy in results."

As an individual-analysis discipline, general psychology

will never tell us the answer, because it lies within social science. Cultural survival requires strategies specific to a micro-environment. Thus, in a cash-cropping area, whose inhabitants are paid by weight, weight would subtly be taught before other qualities. But in a culture changing from (say) foraging to horticulture, something as esoteric to us as a plant's sex might be emphasized as a means of ensuring future botanical breeding. Thus, among the Kabira people east of the China Sea, "hundreds of wild plants are named. . . . Even a child [whose age seems in this context to begin around four or five] can frequently identify the kind of tree from which a tiny wood fragment has come and, furthermore, the sex of that tree. . . ." (A. Smith 1960:150). There was no awaiting the concrete operations that allegedly begin at 7-1/2.

Again, consider a Hopi community of the 1890's. Among those Arizona Amerindians, a boy of perhaps four would be sent to seek buyers for his family livestock. He could not tote the great beasts. But his village trusted its own residents. Hence the lad could walk door-to-door with a mere stick that affixed sample animal hairs. From those swatches could be inferred the livestock sizes and worths. Hence the young merchant was required to imagine what Piaget would term changeable quantities and volumes: "I had to remember the value of these objects and know exactly what the owner would take in exchange. It was great fun, and it also taught me to measure and to count."

But within an animal species, volumes vary rather directly with weights. Probably for that reason, ". . . . I did not learn much about the weights of things at this time" (Sun Chief, in Simmons 1942:61; cf. 66). Yet weight was Piaget's alleged intermediary between substance and volume. Not in Hopiland!

As another instance of the influence of local tradition on the sequence of material commutativity, we note in counterclaim 29 that solids were perceived interchangeable in Mexico by children from potters' families more than from non-potter families. Similarly, an unpublished analysis by Pierre R. Dasen (cited in Beman 1972:29) showed that eight New Guinea testees could conserve length when the material was familiar (viz., tobacco twists) but not unfamiliar

(viz., wooden sticks treated by milling machines). And another disconfirmation (namely, Australian aborigines re volume), which adds the factor of transcultural contact, appears in our counterclaim 31. In sum, interchangeability of particular materials depends on familiarity with them. In consequence, a child's understanding of worldly stuffs paces their availability and functions for him. Furthermore, the diversity of techno-environments, intra- and inter inter-culturally, disconfirms the globally uniform and invariant sequence of substance, weight, and volume that Piaget further posited for specific ages.

Claim 22 was that social reciprocity is a projection or extrapolation from the learning of material reversibility after age 7-1/2. Now, such generalized transposability may well befit Geneva: Its region is a leader in constantly interchanging items throughout the West European marketplace, as when liquid Swiss chocolate is molded into bars, or bars melted into a sort of fondue. But such reversibility of inorganics or corpses differs vastly from reversibility in organisms: A pet animal killed by a snowstorm cannot be born again. Furthermore, human youths have foresight, however inexperienced, and so can transcend mere mechanics. Thus a Harrisian approach argues that youngsters need not learn material reversibility to learn social interaction. They may be taught either one directly. Item: Navajoland's economic underpinning was stock-breeding. And it taught its children, far younger than Piaget's 7-1/2, about sheep and horses by gifting them with baby lambs and colts (Carlson and Witherspoon 1968:47, 58).

And sociability commences with birth, rather than awaiting a particular chronology as alleged by the decalage. "This [social-delay] thesis is not correct . . ," complained even Piaget's longtime colleague Henri Wallon (as paraphrased in Voyat 1972-73:18). "These relationships involve the child and the milieu from the very beginning of his life." Even before cognitive interactions can occur, one observes affective relationships (ibid.).

Hence Piaget's supposition of late social learning is belied in those many milieus where survival depends on early fraternization and courtesy.

In such situations, many languages inflect and decline words to indicate the hearer's status. Teaching such proper usage thus simultaneously teaches categorical behavior. And language is learned at the earliest ages. Among the Chaga (Chagga), for instance, the few-months-old infant's babblings of ta and ma were molded by its parents into a submissive plea. And that East African would soon know the terms, meanings, and behaviors distinguishing parents, siblings, other kin, and non-kin. By 18 months, he'd be offering sympathy inflected to the victim's sex, and would be speaking helloes inflected to a visitor's origin. At 24 months, that Bantu-speaker was making requests conjugated with the solicitee's rank. And by 28 months, he was titling his mother by that one of her four roles which reflected her momentary interaction (Raum 1940:169-78). Such social intelligence appeared, not after the beginning of "concrete operations" at 7-1/2, but even before the "preoperational" phase supposedly commencing at four.

For 'reciprocity' is an imprecise term involving permutation and/or mutuality. But the genetic-epistemological argument offered evidence and theory for neither. In fact, culture acts exactly oppositely: It imposes a very unequal burden between children and adults, obliging the latter to protect the former even when youth don't 'deserve' aid. Mechanically, the parasitism could be ended by parental abandonment of a child. But once the perinatal period has been conquered, desertion is virtually everywhere immoral/illegal.

Therefore, contrary to Piagetism, the sheltered child need not learn social permutation or mutuality, but only its own childly role, which may range from considerable altruism to considerable parasitism. Indeed, Yankee graduate students might remain dependents even to age 30 (particularly in anthropology!). But Samoan tots had to become useful nursemaids at about six (Mead 1928:1970:46).

Therefore the subsocial categories, like inertia, that fascinated the biogeneticists can compare with cultural-survival categories like friend only metaphorically. The alleged dependence of social reciprocity on material interchangeability is so vague as to elude confirmable science. We must reject Piaget's claim that the human can learn social reciprocity only after material reversibility beginning at age 7-1/2.

Proposition 23 was that only the emergence of social "instincts" provide a focus for intelligence objectivity. Not so; ideation is reflected and objectified from one's communal situation. And the commencement of ego's social role certainly does not await age 7-1/2. Many cultures label a child from birth on -- as seen in the North American custom of garmenting boy-babies in blue, girls in pink. Almost immediately after birth, enculturacion begins to teach a child to correlate a proper name with a social relationship. At the same time, the youth is learning the proper behavior toward that function. Mere syllogism thence instructs him to tap those community roles for his needs and safety: 'As a child, you must bow toward any neighbor. But Patinggi is a neighbor. Therefore now bow toward Patinggi.'

Again, a stabilized desert culture taught mental skills clearly and early. "By the time I was six, therefore," reminisced a Hopi Amerindian (Don Talayesva, in Simmons 1942:68), "I had learned to find my way about the mesa and to avoid graves, shrines, and harmful plants, to size up people, and to watch out for witches."

And so a given talent is not produced at one pan-cultural age. Each society instead teaches the sects and kinship grades within which sociability, even marriage, are permissible and impermissible. Interestingly, college students of the 'sophisticated' U. S. A. have been found to understand their social relations worse than the semiliterate Aymara Amerindians. Why? - Goodenough (1961:85-86) does not clearly speculate. But the present author would note that the Aymara have suffered centuries-old exploitation (LaBarre 1966:143). Such an ethnohistory would behoove inbreeding, hence alertness to fellowship-boundary learning. By contrast, Yankeeism allowed some inter-class mobility. And egalitarianism peaked at campus age, acting to discourage campus sectarianism. The learning of social reciprocities among Aymara and Yankees can, then, hardly be uniformized by a "Spansule" theory. In summation, objectivity does not spring from late-blooming sociability. Each talent is separately hammered out on

the anvil of a particular techno-environment.

Claim 24 was that learning reciprocity must precede ruly behavior, with play replaced by rivalrous realism. Not so. First, ruly games can be followed by children who have not yet attained Piaget's 7-1/2-to -11-1/2 period. Thus, six-year-old Liberian Kpelle played a verbal game involving strict prescriptions (A. Kulah 1973, discussed in Cole and Scribner 1974: 183-84). Secondly, many cultures continue play's importance into adulthood. Play "is thus not displaced by realism or by greater rationality, nor does it cease to be a vital function with age. . . ," protested Sutton-Smith (1966:1971:334). "Without such a point of view it is difficult to understand the verbal play of adults, their social and sexual play, their rituals and their carnivals. . . ." Indeed, "this present [Sutton-Smith] criticism of Piaget's view of play . . . parallels [L. S.] Vygotsky's. . . ." (loc. cit.).

In fact, the degree and duration of sportive interaction obey socio-economics rather than multistage switch-ons. Thus, when Piaget characterized (the world's) adult games as infused with "honest competition, so that some win and others lose," he naively overextended Swiss commercialism, neglecting alternative game categories. That of cooperation is exemplified by the Tangu of Madang, New Guinea: Their two taketak teams would strike coconut spines until both had attained equivalent rather than hierarchic scores (Burridge 1957:1968:316). Such games obviously purpose solidarity, and Burger (1972a) termed them "eurythmics." So sport too is more soundly ontologized by cultural materialism than by a decalage where play is but one phase of intellectual "rocketry."

DISCONFIRMATIONS OF CLAIMS 25 THROUGH 36

Claim 25 was that only after learning social reciprocity and rules from age 7-1/2 can one understand kinship. This is doubtful, indeed erroneous, for the same kinds of reason as disconfirmed the previous bits of genetic epistemology. First, if reciprocal means 'mutual,' then Piagetism must exclude the

world's many non-mutual kinship systems. Thus, Angloamerica makes mother the reciprocal of father. But elsewhere, inter-sibling relations may be assymetrical (LeVine and Price-Williams 1974:28): Hausa fathers, for instance, estranged their children, especially daughters. In fact, when those Nigerian youths were asked to name the occupants of their walled compound (gida), fathers, although present, went unmentioned by 22% of the sons and over a third of the daughters (op. cit.:41).

More broadly, many cultures employ kinship for some of the economic functions for which Euroamerica utilizes the impersonal marketplace. Hence the former teach kinship principles and etiquette at far younger ages and in greater detail than does Euroamerica. Consider, for example, the Aranda of central Australia. The desert unpredictability behooved their befriending groups spread through various ecologies. Such networks were bonded by four kinds of descent groups, eight "sections," and a deductive logic of symmetrical cross-cousin marriage. Its mere outline required the anthropologist Harris to display four text pages and a 28-item model (1971:338-41, 366). Now, those Aranda themselves not only lacked textbooks; they were illiterate. Yet they could teach their children from young (unspecified) age their 'baffling' marriageability rules via each descent group's membership scheme.

The Murngin too taught a boy kinship, probably beginning somewhat before age-six circumcision. That northern Australian would learn his complex obligations to gawel, one of several types of mother's brother, and to waku, his sister's child (Lloyd Warner 1937:93; cf. 102, 127).

Similarly, in the Forrest River area, "by the time they have reached five or six, they can distinguish between their own father, mother, brother, and classificatory relatives," for whom there were some 23 specific terms (Kaberry 1939:48-52). True, practice with the terms was a prime teacher, for incomplete contacts suggested that "the children did not seem to be able to infer [further] relationships once they had been taught others, and hence had not grasped the logic of the kinship system [as to the categories of the people who were always absent]," But they correctly "called by kinship terms most of the elders in the camp with

whom they had any intercourse, and other children in the compound" (op. cit.:68). And such memorability expanded in proportion to those Australian aborigines' cultural calendar, not hormonal calendar: "It is not until the age of seven or eight, during initiation ceremonies, that the importance of certain [further] relationships impresses itself on the mind of the child, because of the functions [n. b.] performed by certain men and women at the time" (op. cit.:69).

Theory and evidence thereby shatter Piaget's allegation that the learning of social, mathematical-like reciprocity and the attainment of age 7-1/2 to 11-1/2 must precede the understanding of kinship. Not only are his terms vague and Europocentric, but kinship rules need not follow the Newtonian reversibility of the inorganic world.

Proposition 26 was that commutativity plus reciprocity enable operational mechanics. Again multistage switch-ons were confused with zeitgeist diversities. Problem-solving varies with the mechanical task, the dangers it presents, the availability of adults, etc. Middle-class English youth, as one instance, would confront such home problems as the malfunctioning of electric switches in the temporary absence of parents. Such five-year-olds, Isaacs found (1930:1966:80), didn't await 'concrete' maturity, as Piaget had imagined, but were demanding and obtaining detailed instruction "about cooking, about water and snow . . . about the . . . electric light . . . ." Other five-year-olds understood such basic physics as the relation between pressure and the rise of water-level. "According to Piaget," twitted Goodman (1970:117-18), "these children were much too young to have any [such] understnding of mechanical causality."

Nor could the structuralist plead that such disconfirmations simply never reached his personal attention. Indeed, one episode found him lecturing on this very talent-maturation postulate while visiting Cambridge (England)'s Malting House School: 'A child does not appreciate mechanical causality (such as the functions of a bicycle pedal) until eight or nine, so that when a youth notes or draws the pedals on paper, he overlooks their gearing.' Whereupon, companion Isaacs (1930:1966:43-44) summoned a

nearby tricycler, age 5-3/4. She queried Dan: "How does it go forward when it does?" He replied to Isaacs and Piaget, "Your feet press the pedals, that turns the crank round, and the cranks turn that [pointing to cogwheel] round, and that makes the chain go round, and the chain turns the hub round, and then the wheels go round. . . !" But this eardrum-and-eyeball evidence did not re-doctrinate Piaget on mechanical causality: His statement attributing it endogenically (quoted in our summation of his claim, above) occurred some two decades after the aforementioned contrary evidence was witnessed by him.

Proposition 27 was that deduction ability ("formal reasoning") appears only after 11-1/2. This too is vapid. Piaget's exemplification of formal reasoning ("if we say that --- then we must say that ---" [n.d.a:1928:250-51]) is really no more than our substituted environmental syllogism concerning kinship terminology: It links certain terms with others, and all terms with behavior. Thereafter, a mere role designation, such as "your father's sibling" or "your elderly neighbor," shortcircuits the decalage's "concrete-operations" steps, and suffices to activate a deduction in the child. For the same reason, any particular beginning age (Piaget's 7-1/2 to 11-1/2) is spurious; witness this talent in age-two Chaga youth (counterclaim 22).

Non-kinship types of deduction also emerge with ethnic specificity rather than with global chronology. Thus, the East-European Jewish ghetto had a long tradition of intellectualism. And so, especially before World War I, according to Zborowski and Herzog (1952:93 et passim), the complications of the Old Testament's first five books would be interpreted by the youth beginning somewhere between three and 13, depending on personal qualifications and resource availability. That process required translation, synthesis, and/or analogy. It produced a hermeneutics which clearly seems deductive.

Similar disproofs concern more specifically expected effects: For six experimenters catalogued in Wohlwill (1963:1968:443-44), commutativity did not produce transitivity-thinking; volume-conservation did not facilitate volume multiplication; cardinal numbering did not facilitate logicizing; etc. From all such data, then, we must disconfirm Piaget's supposition that the commutativity skills must be learned before

formal reasoning begins at a global 11-1/2.

Claim 28 was that only around 11-1/2 does innate egocentrism become decentered toward sharing and generosity. Alas, cooperation is in the techno-environment rather than in rocketry switches. (A similar confusion is even now reappearing in the "generosity-gene" doctrine of the socio-biologists -- and rebutted as in Sahlins 1976.) Thus, a Guadalcanal mother would give her under-five child a basket of yams, with instruction to carry them to their dinner-table guest. In that practicum, those Melanesians understood perhaps better than Europeans the cultural role in reciprocity: "This is how we train our young to behave!" they boasted to Hogbin (1964:1973:228).

Not only ethnography but also experiment disprove a biogenetic basis for generosity: A child can be enabled to distribute things of value ("coins") either all to himself, all to his companion, or proportionately. This hypothesis was tested by Nancy and Theodore Graves diachronically and cross-culturally (viz., New Zealand versus Polynesia's Cook Islands). In five-to-eight-year-old children, they (1977:14, 57-58) found rivalrous to be in 14% of the Cook Islanders, but in fully 42% of the New Zealanders. That is, generosity is not a maturational pancultural, though Piaget had imagined it to be ($p < .0001$). Furthermore, it was factors associated with the New Zealand-imported school system such as high grades ($p < .01$) and neat uniforms ($p < .001$), rather than degree of urbanism, etc., that correlated best ($p < .0001$) with generosity/rivalrousness.

And lastly, the Polynesians did not become more generous with adolescence, as imagined by Piaget, but less: from about 45% around age five, down to some 15% around age 11-1/2, a decrease that is greatly significant ($p < .001$) (Graves and Graves 1977:Figure 3).

In this "challenge to Piagetian theory," then, "it is not the cognitive capacity for altruistic behavior which seems most important . . . in prosocial behavior, or its development over time, . . . [but] the cultural context," especially operating through the Occidental-based school systems' reward-individuation (op. cit.:39-40).

Proposition 29 was that the emergent skills obviate particular environments. "Piaget is frequently credited with being an 'interactionist' (in the nature-nurture controversy) because he states

that the child gets to know about his world initially and predominantly through his 'acting upon' the environment," complained Birns (1973:26); "but he never considers how the [specific] environment affects the child."

Were milieu particularities irrelevant, as argued by genetic epistemology, then permanence-learning, or commutativity, would hold constant despite diversity of familial experience. But it doesn't.

One reason for this Piagetian neglect was probably the segregation of Occidental infants from adults, as via kindergartens. But the techno-environment impinges more directly in the Third World. Thus, "from the first weeks of life Zhun/twa [Bushmen] infants, when awake, are carried. . . . On the mother's hip they have available to them her entire social world, [economically including] the world of objects (particularly work in the mother's hands)" (Konner 1972:292).

Thus age difference need not mean difference in techno-environment. Consider, for example, the rural town of San Marcos, Jalisco, Mexico. Some of its families made pottery, with the result that from about the age of four their children would play with clay scraps. By eight, they would be experienced clay-bakers, routinely removing and reforming the plastic. These youths were administered Piaget's conservation tests by Price-Williams and others (1969a, 1969b). The test's five parts (for number, liquid, substance, weight, and volume) received conserving answers from only two of 16 non-potter-family children -- but (respectively) from 16, 14, 15, 16, and 16 of the potter-family children. Particular environments were influencing emergent skills!

Especially do we see this instilling of specific skills when a society develops economic interchangeability, such as markets for external trade. What Bruner was earlier quoted as terming intermodal "translatability" is then taught to youth as formal schooling is established. Hence the presence of academe is another milieu variable that overrides genetic-epistemology's milieu-free claim. Five- to-11-year-old Ga children, for example, were tested in the commutativity of clay length, quantity, and so on. Fitzgerald (1970:1971:680-B) found those Ghanaians showing statistically "significant relationships between years of schooling and performance." Thinking patterns <u>are</u> dominated by ethnic institutions. It was erroneous of Piaget, protested Isaacs (1930:1968:58), "to attribute to [biological] matu-

ration certain phenomena which can be shown to be to a real extent a function of [cultural] experience."

Claim 30 was that all conservation skills eventually emerge everywhere, that is, without regard to ethnicity. Such a statement confuses possibility with actualization. Certainly every human born with a normal brain can learn to deduce and otherwise to perform intellection. (Hence the basic flaw of racists' imagining non-Anglos to have lower "intelligence," as exposed by Brace and Livingstone [1971:64].) But the function of each culture is to mold the particular ideologies and logics to local Darwinian needs.

Thus the objectification that constitutes "concrete operations" requires the use of grouping-subskills like mutually-exclusive complementary categorization (cf. Boyle 1969:55-56). But small, self-contained communities rarely if ever need such precision, ergo may not traverse such stages. Just that irregularity was found among seven-to-12-year-old Akamba children in a test to which John W. M. Whiting has kindly called my attention: "According to Piaget's criterion of 'logical sorting' -- such as the . . . identification of positive defining characteristics for each category . . . -- none of the [Kenyan] children would be considered 'concrete-operational' . . . .

". . . . . .

"We can conclude, then, that the 'concrete-operational' stage [which includes conservation] is not universal," insisted fieldworker Janet Fjellman (1972:177-78). Indeed, her East African study may further discredit biogeneticism's much more basic "preoperational phase" claim of universalized categorization.

Zambian children likewise defied Jean Piaget: Heron and Simonsson found (1969:286, 290) that they ceased to learn weight-conservation as early as age 10, after discovering only '50% of it' [!]. The explanation was probably techno-environmental: In that part of south central Africa, "questions of amount or quantity are not dealt with in terms of precision."

[illegible] cultural conditions, or techno-environment, are not to be a mere afterthought. They determine which human latencies will be manifested.

Proposition 31 was that the skill-emergence sequence is universal, that is, not ethnic-specific. To the extent that this may be

pancultural, it is so only by definition: "Concrete operations" really constitute "objectification." And precise definition shows that one must objectify before he can mentally interchange.[1] Hence mere definition makes the concrete-operations-era talents emerge before one can learn commutativity (Burger 1977a:15-18).

But the vagueness of the decalage's intransitive phases flaws even that definitional nesting. Broad terms like "conservation" are not fully operational. And ethnography reveals exceptions. Thus, our counterclaim 2| gave several disconfirmations of alleged sequence within a single culture. We would now indicate that two cultures almost surely have a greater range of materials and processes than one; hence transcultural contact intensifies recognition variability. The dual societies may communicate momentarily, as through a non-ethnographer's imposing Western test standards, or permanently, as through improved transportation. Thus, DeLemos (1969:262, 264) applied Piaget's experiments to 145 eight-to-15-year-old aborigines of Australia's Northern Territory. She reported only 22 of them as conserving quantity. Forty-one conserved weight, and only 10, volume. The fact that those three figures were neither equal nor decreasing disrupted the progression which, she complained, "is important to Piaget's theory of stage sequences."

For it is the environment that sets the priorities. As Margaret Mead tried (1956:1960:49) to summarize to Piaget in person, "in regard to such things as walking and talking, different . . . arrangements for learning in different cultures — as for example when children . . . hear phrases stated in their name long before they could formulate them themselves -- . . . vary to such an extent as again to make any idea of general stages appear useless." Genetic-epistemology's sequence universality of talent emergences is not meaningful.

Claim 32 was that intellectual ontogeny recapitulates intellectual phylogeny, and that intellectual evolution parallels physical evolution. The combination, in which ontogeny recapitulates phylogeny, is, of course, Ernst Haeckel's "biogenetic law." Alas, it isn't 'lawful.' For "selection pressures operant in shaping form and function during ontogeny," protested J. Wind (1973:556) in summarizing the evidence against Haeckelism (without regard to Piagetism), "are usually completely different

from those operant during phylogeny." And for the same reason, there is not necessarily any "parallelism" between physical and intellectual evolution. Both proto-chimpanzees and proto-humans were coterminous, but only the latter, probably through a series of neurological opportunities (cf. Gaylord Simpson 1949:XII), developed an angular gyrus (Geschwind 1972) and a relatively immense New Brain. Poof! goes the parallelism that Piaget had termed his "fundamental hypothesis."

Proposition 33 was that civilization matures a person to individualism, while primitivity arrests him at a collectivistic mentality. Partially to refute this allegation, Margaret Mead anthologized a dozen case studies revealing that certain zeitgeists produced individualistic competitiveness even among primitives, but this classic (Mead 1937) still does not seem to have influenced biogeneticism. Since then, many new cases have appeared to show that the degree of collectivism reflects matters like peacefulness and market size. Contrary to the implication of a "pan-evolutionary" Piagetism, for instance, New Guinea's low-energy Kapauku culture was not found communal, but egocentric and atomized (Pospisil 1963:27, 404). At the same time, individualism was not the dominant mode in such non-primitive cultures as the anti-capitalist U. S. S. R., and the Arab-threatened "collectivistic" Israeli kibbutzim (e.g., Spiro 1955:1963: 476-79). Biogeneticism was naive to equate maturity with commercialism.

Claim 34 was that "primitive mentality" is simply intellection fixed at a less-than-final vertical-decalage stage. This rather ethnocentric argument is readily disproved by many studies finding non Western cultures to muster intricate reasoning entirely adequate to their milieu variables. Gladwin, for instance (1970:181-89) analyzed Puluwat (Micronesia)'s astonishingly ideational etak navigational reasoning; it extrapolated from stars to imaginary islands. The most competent boatman there was found brilliant in "reckoning" -- but would fail when given problems involving a different logic: the "trouble-shooting" peculiar to an engine-repairman, or the "heuristics" (postulation-shortcutting) peculiar to the Occidental science teacher. Gladwin explained (1958-59:1960:30;

cf. 1970) that "a person, no matter how adequately his brain functions in a neurological sense (and Trukese navigators must certainly have good brains), cannot solve abstract problems as long as he has learned only to think in concrete, unambiguous terms." So adult Micronesian logic queered the Swiss's idea that reasoning evolves unilinearly. Deduction is only one of the possible logics. As such, it develops zeitgeist-specifically. In consequence, the skills that Piaget claimed important and universal do not emerge ubiquitously.

Would he answer that even in the foregoing contrary instances, the intellectual skills were present, merely lying latent, and that their manifestation is unnecessary to his paradigm? - Even if so, our criterion must be manifestations, not latencies. To deny that would be to enter fantasy. As Samuel Johnson cautioned (in Boswell 1799:1970: "7 Feb. 1775"), it must be "presumed that what does not appear does not exist." Piaget to the contrary, then, normal-brained humans can perform such deduction-related processes as multiplication as are required by their (not Geneva's) environments.

Where such an activity is needed only rarely, they will perform it slowly. Thus, in Rajasthan, India, the high-castes' fields would normally be irrigated by four-family cooperatives. Their strategy was to divide their resources into fourths. But, according to Rosin (1973:3-4), one man once faced the novel problem of costing metals. He had never learned Western multiplication. Instead of giving up, he counted his finger joints, etc., then applied his familiar quartering methods. And after 10 mornings, he attained an accurate solution. This is no 'primitive mentality,' but diverse talents honed to milieu needs.

Furthermore, the very allegation of aboriginal fixation conflicts with Piaget's internal logic whereby, in claim 30, he argued that conservation skills do invariably emerge universally. And he did so in the very same year in which the present author quoted him as claiming ethnic-specificity elsewhere: "We have never dreamt of seeing child thought as an hereditary product of the primitive mentality" (Piaget 1928, quoted in Lévi-Strauss 1967:1969:88). Here, then, is another double-think.

Cultural materialism would, by contrast, simply argue that both commutativity and other skills such as deduction develop diversely (as in the non-Piagetian form of reckoning), depending on the techno-environment.

Proposition 35 was that a child cannot be taught a particular skill earlier than it matures within him. Were this the fact, it would be very difficult to explain why the multi-billion dollar activity of formal education grows yearly and globally. Darwinian pressures for societal economy should long ago have lopped the schooling institution if intellectual maturation could not be accelerated or otherwise redirected.

In fact, however, formal school emerges to broaden a child's inherently parochial background. It does so in part by teaching perceptual analysis. "The first result of schooling," argued Greenfield and others (1966b:315), "is to 'perceptualize' a child's approach to conservation." This is not to say that every tot is to be reoriented from Robert Redfield's Little Tradition all the way to the Great Tradition. It means merely that the eidos of his housing compound is to be replaced with that of at least a parish (and sometimes of the world). Hence the culture must redirect him.

Now, Piagetian Irving Sigel was earlier quoted as limiting educability to a given child's decalage phase. Yet the same Sigel elsewhere (Sigel, Roeper and Hooper, 1966, discussed in Mussen and others 1969:457-58) found that the mere display of materials like fruit could, with a few half-hour discussions about their shapes, teach commutativity to "most" of the five-year-old subjects who were not yet conservers -- without hands-on experimentation. Here is another disconfirmation of age-bound educability. Others appear in our counterclaims 15 (U.S.S.R.), 28 (Cook Islands), and 29 (Ghana).

Consider, too, that the epistemologist's formal-reasoning era consists in the attainment of algebraic deduction (as elaborated in Burger 1977a), beginning at 11-1/2. Now, Soviet educators formerly introduced algebra and geometry at 12. But the mid-1960's engendered greater environmental (vocational) need for those skills. To familiarize youths with the mathematical and engineering sequences, the administration then simply transferred those subjects two years earlier. And

as Rosen would report sometime later (1971:221), "the shifting of the foundations of algebra and geometry to the fourth and fifth forms [= ages 10 and 11] and their correlation with arithmetic greatly enhance the level of knowledge [now being successfully] acquired." The learnable skills were again being scheduled by culture, not by the hormones. Large and feedback-oriented societies are, in other words, constantly disconfirming the biogenetic implication of curricular fixity. And a final coffin-nail in the argument that a school must await decalage-maturation was eventually hammered by the ambiguous Piaget himself: He stated (1948b:1973:55) vaguely that "the school carries a great responsibility regarding the final success or failure of the individual in pursuit of his own potential and adaptation to social living." Again (in 1948b:1973:16), that "the teacher as organizer remains indispensable in order to create . . . counter-examples that compel reflection [etc.] . . . ." Age-bound educability is, then, another non-claim.

Claim 36 was that the Helvetian had discovered not merely empirical laws, but an interrelated set, a disciplinary matrix. Alas, a basic of theory is "the coherent set of hypothetical principles. . . ." (Merriam 1961:1967). But the almost-three-dozen propositions we have elicited are linked by no one or two concepts that are coherent or proved. Instead, his mere empiricism appears in (for example) claim 30, that (only or principally) conservation skills must appear in all cultures.

Furthermore, there are paradoxes even within Piaget's slowly-revealed propositions. For example, the just-cited claim that conservation skills do eventually appear in all societies can hardly be reconciled with his claim 34 that a primitive society has not matured to deduction.

This is patchwork, not paradigm. By contrast, a true disciplinary matrix would justify such a stopping point on some broader basis. Ecological, for example: 'As other researchers have shown [citing references], only commutativity but not deduction is required for a community's successful procreation because [etc.].' Or biochemical or neurological reasons why formal reasoning can be aborted by (say)

climate. But Piaget simply set a low-level unification, then "undered" even that base with a conservation universality.

Likewise in claim 8, that culture causes variation: As we demonstrated in counterclaims to that proposition, Piaget has not specified particular cultural correlates. He did not show, for example, that certain kinship equivalencies are more accelerated by horticulture than by agriculture. And so "culture" is his mere dumping ground for all contrary evidence.

To gain perspective on this ploy, let us suppose that Isaac Newton had declared that the solar system obeys attraction proportional to the squares of stars' separation. Now suppose he footnotes that the perturbations of Mars also "of course" obey the 12 Zodiac housekeepers' moods -- and that Earth wobbles peculiarly because its inhabitants worship Islam. - We would certainly not accept such a pastiche as unified theory! But similarly, Piaget's constant addition of variables revealed no open mind, but rather a-theoreticalness about culture; his addenda outrace a Truth Squad's disconfirmatory data. The Helvetian's publication prolificness does not, then, constitute the theoretical parsimony demanded by a paradigm. And so even his last, unifying, claim must be invalidated.

CONCLUSION

Jean Piaget's fame for the ethnography of inter-War European children is permanently assured, and has stimulated vast research into the nature of human maturation. But the carryover of that "halo" into principles of ethnology cannot be justified. His proposed phases whereby all children attain intellectual adulthood must be challenged on three broad fronts:

Many are merely definitional (Burger 1977a). As for others, his situs on the individual rather than on the ethnic-specific is only one possible interpretation (Burger ms.). And where his claims are testable, cross-cultural analysis reveals significant disconfirmation.

Arranging his arguments for that third approach has been the subject

of the present article; we offered a concordance of Piaget in 36 major propositions. Of them, items 1 through 3 and 31 were found merely definitional, while claim 9 was found to apply only to pre-linguistic (='precultural') children and is therefore beyond our culture-specific criticism. But for each of the remaining propositions -- 31 of them, the bulk of Piagetism -- analysis either dissolved the claim into unverifiability, or specified humanity's techno-environmental diversity, disproving it. The Swiss's ostensibly harmonious decalage is but discordance -- natural history gilded in pre-Darwinian empiricism. A behavioral understanding of ideational maturity cannot come from a merely "on-off" multistage-rocketry kind of interactionism. Rather, we suggest that intellectuality has evolved to serve the ethnic exploitation of the material conditions of life. And so maturation schedules do not obey genetic epistemology but an anthropological interpretation of materialism.

NOTES

[1] Elsewhere (Burger 1977), we recast Piaget's major phases into processes and out of the structural form in which he presented them. We do so by translating each intellectual skill into an equivalent transitive verb. Thus, his "preconceptual" era is found simply to develop the skill of "categorizing." But as we arrange the transitives, each is shown completely to include the prior process. The final talent of deducing can, with considerable patience, be defined down from categorization to the earliest talent, that of observation. Hence, excluding Piaget's claims of particular skills emerging at particular years (a matter discussed in the present article), our definitional argument shows that Piaget's successive phases are merely consecutive, nested definitions. They are arbitrary divisions within the full range of processes occurring during maturation. To state them as a sequence should not, then, have required any clinical work at all.

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